Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

SEPTEMBER 1957

A SIMMONS-BOARDMAN TIME-SAVER PUBLICATION

2 MINER

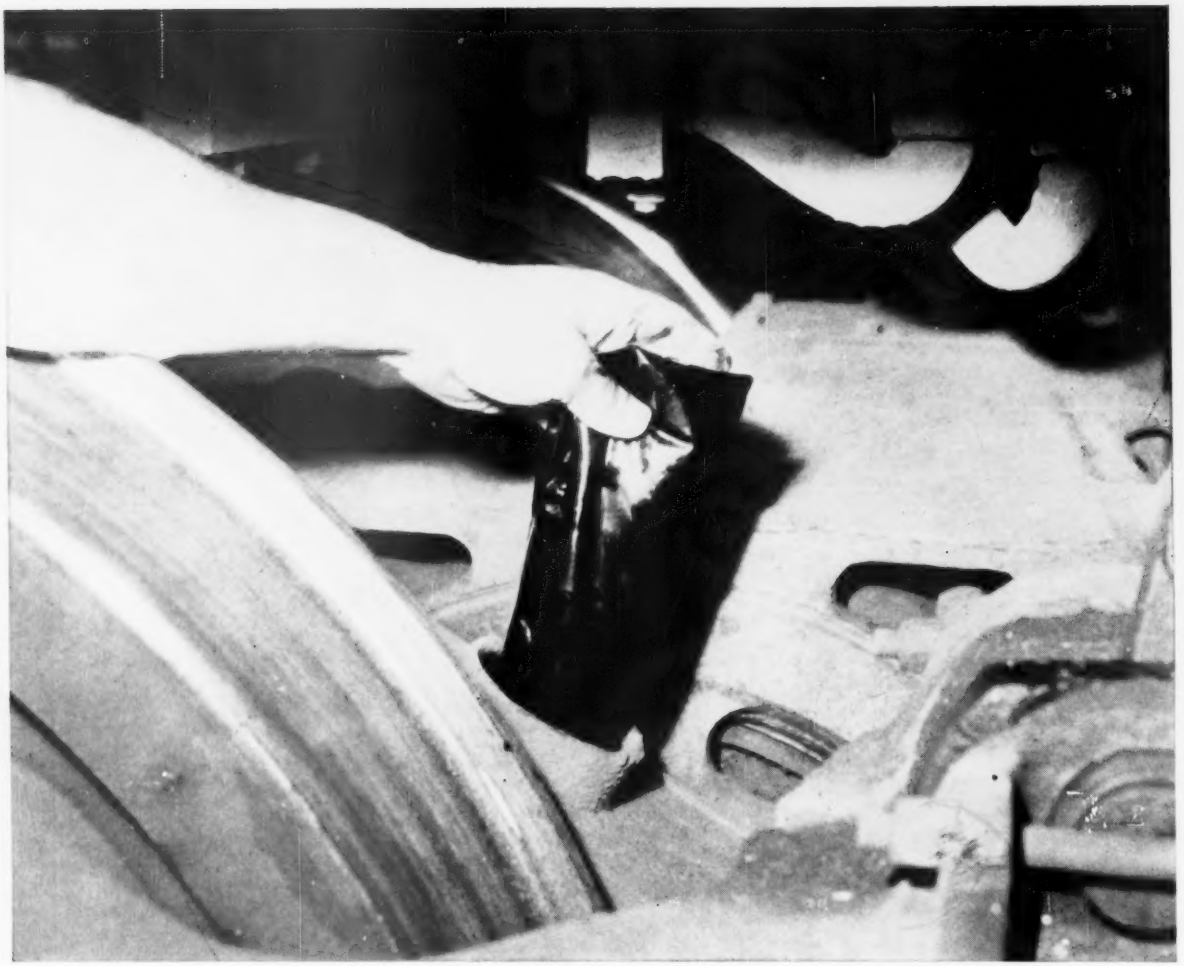
OUTSTANDING RECOMMENDATIONS
FOR
HIGH OPERATING EFFICIENCY

CLASS A-22-XL

CLASS RF-333

The Miner Class A-22-XL Friction Draft Gear and Miner Class RF-333 Rubber-Friction Draft Gear fulfill every requirement for efficient performance in freight train operation and are approved for unlimited application to cars in interchange.

W. H. MINER, INC. CHICAGO



It's "in the bag" for easy application

. . . Texaco Crater

Texaco Crater is now available in 1-lb. polyethylene bags —48 bags to the case—clean, convenient, economical. This is the same reliable product that has long been giving traction motor gears outstanding protection in all types of Diesel gear cases. But now—make-up servicing is so fast and easy—just drop in bag and all.

Time and again, comparative road tests have proven that Texaco Crater gives more miles per pound. Now, with in-the-bag application, over-all lubricating costs can be lowered, too—because in over-the-pit servicing, it's easy to control quantity, eliminate all waste, sharply reduce application time.

For full information, call the nearest Texaco Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis, or Atlanta. Or write:

☆ ☆ ☆

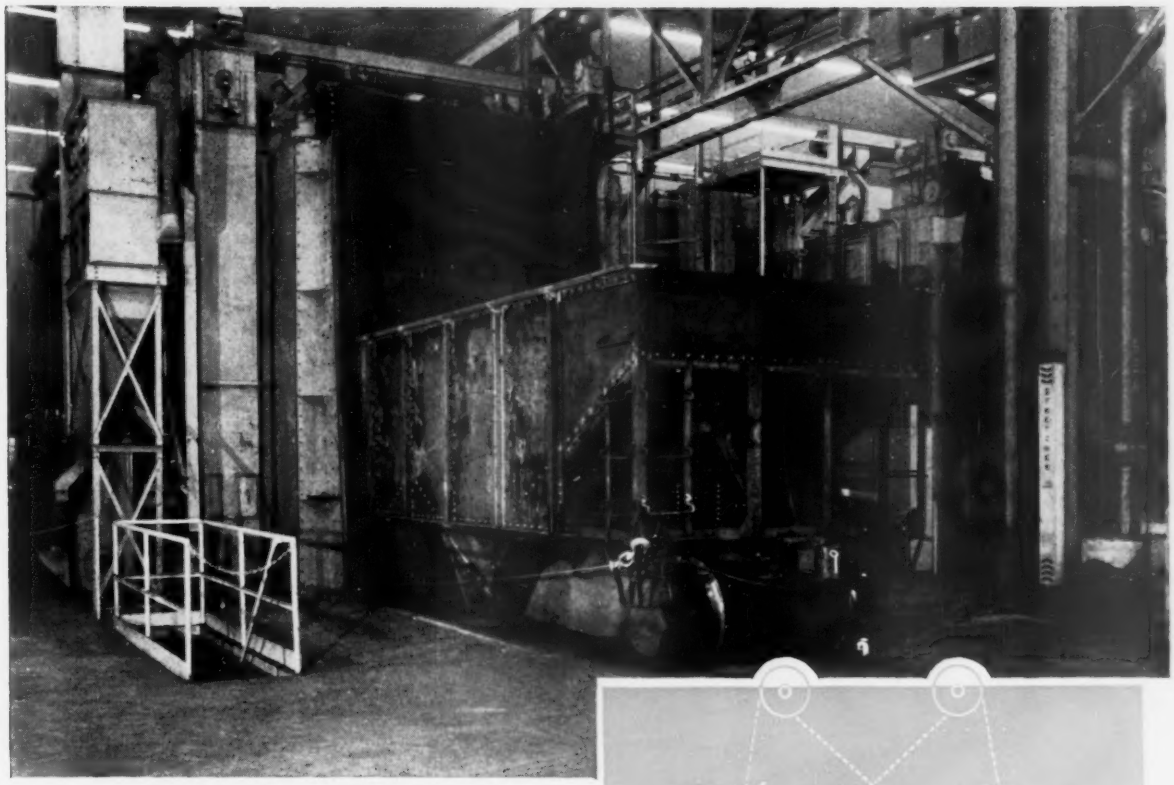
The Texas Company, *Railway Sales Division*, 135 East 42nd Street, New York 17, N.Y.

TEXACO

TEXACO Railroad Lubricants

AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES



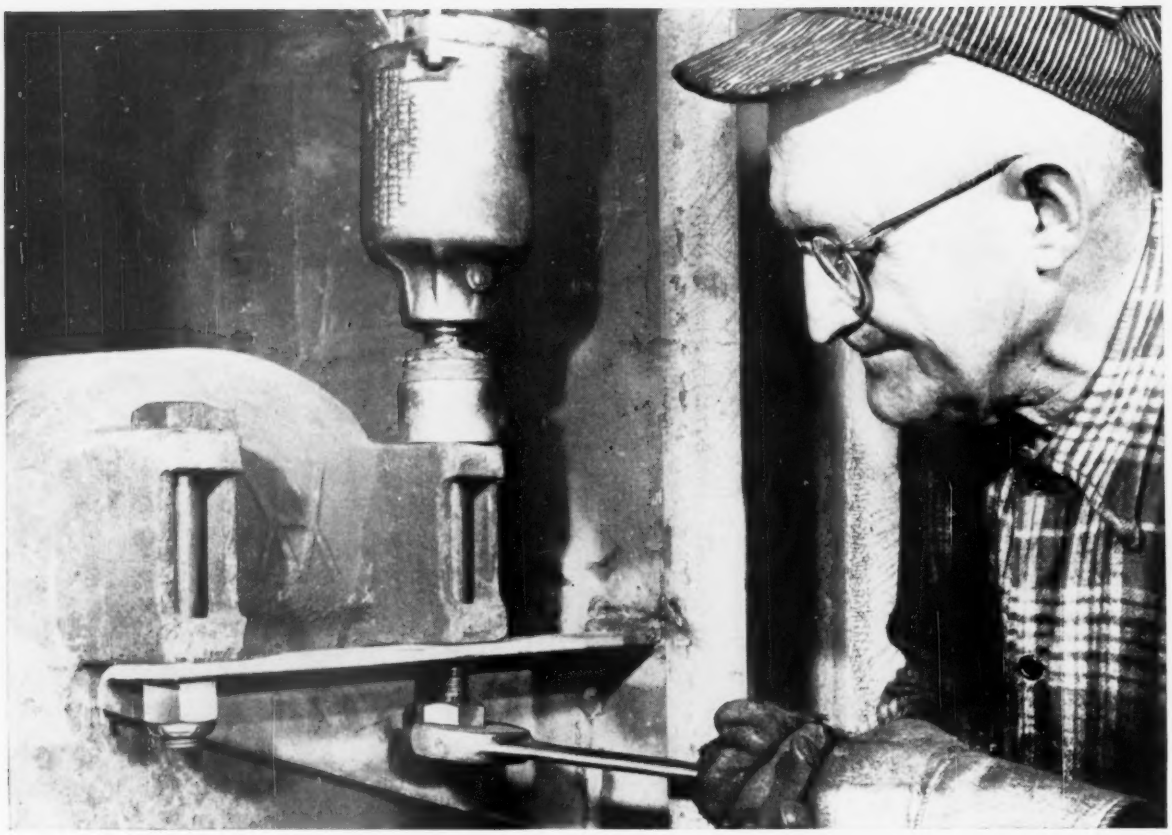
AUTOMATIC Pangborn Rotoblast cuts freight car cleaning time 85%!

In the Pennsylvania RR's Samuel Rea Shop, Hollidaysburg, Pa., hopper cars and boxcars are Rotoblasted before painting and stenciling. With the equipment previously used for this job, five men each spent an average of 2.7 hours cleaning a typical 42-ft. hopper car. Today, using special Pangborn Rotoblast Rooms for the same job, the railroad has cut labor to *four* men per unit—and they *turn out four cars every hour!* In addition to cutting man-hours 85%, the quality of cleaning is far better than before.

If you have an unusual cleaning problem, Pangborn offers a special service. Pangborn engineers will study your problem and its relation to your production line. Then they will design a Rotoblasting machine for your particular needs. Find out now how Pangborn's engineering service can give you better cleaning and faster production at lower cost.

Write today for Bulletin 1210A to PANGBORN CORP., 3700 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn ROTOBLAST cleans cheaper

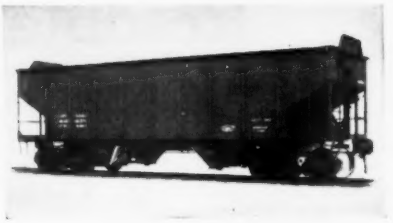


HOW TO ELIMINATE "BAD ORDER CAR" DOWN-TIME DUE TO FASTENER FAILURE

High speed freight hauling has emphasized the importance of such typical fastener "tough spots" as the AB valve and the brake cylinder and reservoir. This problem of costly fastener failures can become especially critical on specialized equipment such as hopper cars subjected to shaker service, which are continually in bad order due to loose air brake equipment.

The present tremendous effort to replace obsolete rolling stock with modern equipment designed and built to perform efficiently under the increasingly severe conditions imposed by modern traffic operations has focused attention on improved freight car design . . . and fastener requirements are included. As a contributing factor to reducing the number of "bad-order" cars and minimizing inspection and repair costs, leading American railroads are currently specifying the protection of Elastic Stop® nuts for all bolted applications in the vital areas.

For over 27 years American heavy industry has used vibration-proof Elastic Stop nuts on the "tough spots"



where ordinary fasteners perform unsatisfactorily due to severe shock loads, vibration and impact. Positive cost savings result from reduced inspection and fastener maintenance requirements. And only the red elastic locking collar protects internal bolt threads against corrosion!

For detailed information on preventive maintenance savings provided by vibration-proof Elastic Stop nut fastening methods on locomotives, passenger and freight cars, write Railway Sales Division, Dept. N89-928.

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 Vauxhall Road, Union, New Jersey

ROLLPIN TRADEMARK

PUBLISHED MONTHLY BY THE

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RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal

SEPTEMBER 1957 VOLUME 131, No. 9

MOTIVE POWER AND CAR

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NEXT MONTH:

B&M RDC Engine Shop

EJ&E Box Car Shock Absorbers

"Cleveland Rapid" Car Shop

EQUIPMENT . . . NEW IDEAS — NEW USES

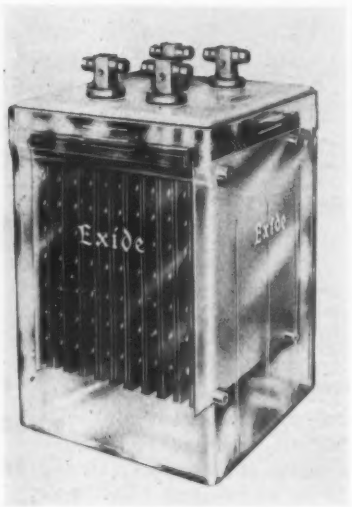
Products of Exhibitors—Allied Railway Supply Association

(Not previously described in Railway Locomotives and Cars)

Air Hose

This air hose is said to simplify replacement of brake, signal, sanding, and other air lines. Adaptable to both old and new installations, the air lines are available in sizes $\frac{3}{8}$ in. through 1-½ in. and can be used in conjunction with existing equipment.

Also available are "Socketless" fittings for use on low pressure applications, featuring a push-on type fitting that requires no tools for assembly. The fittings are especially suited for electrical control cabinets and air brake gages. *Aeroquip Corporation, Dept. RLC, Jackson, Mich.*

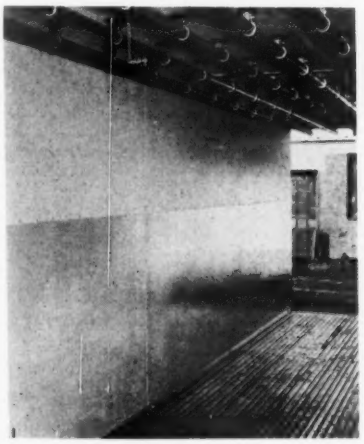


Plastic Jars for Stationary Batteries

Moulding of large plastic jars for stationary batteries has finally made it possible for one manufacturer to completely eliminate the use of glass jars for this purpose. Use of a strong, lightweight, heat-resistant polystyrene plastic jar has enabled the manufacturer to increase the rated capacity of its batteries, assure permanently leak-proof jar construction and substantially increase electrolyte volume.

The container, 14-½ in. by 13-$\frac{31}{32}$ in. by 19-$\frac{5}{8}$ in. deep, is used for the largest cells. The change from glass to plastic completes the conversion of stationary power units used in utility, telephone, railway, emergency lighting and industrial plant operations.

The batteries are rated from 415 to 1,173 amp-hr at the 8-hour discharge rate. Use of the plastic jars has made it possible to enlarge the plate size to gain up to 11 per cent in rated capacity. *The Electric Storage Battery Company, Dept. RLC, Box 8109, Philadelphia 1, Pa.*



Lining Panels

The Espey Carliner Panels are plywood, hardwood, or other materials coated by the manufacturer with a material having the same characteristics as the liquid Carliner. It is claimed to have good vapor seal, toughness and resistance to abrasion and impact. It is adapted for the interior of refrigerator cars, refrigerator trailers in piggy back service, interiors of covered hoppers, and for cars hauling grain and such commodities as flour and meat. *Spring Packing Corporation, Dept. RLC, 332 South Michigan ave., Chicago 4.*

Detergent Cleaner

Composition 72 is an alkaline detergent and is soluble in cold or hot water. It penetrates and saturates grease and oil. Once this material cuts between soil and surface, the soil is held suspended in the solution, to be flushed away by the follow-up rinse. Because of this free-rinsing action, it is claimed that surfaces dry streak-free. In addition to being clean, paint has a noticeable sheen to it. Recommended solutions of Composition 72 are within a pH range that assures safety to paint and lacquers. It contains no ingredients that give off odors that would be troublesome in confined areas.

Solutions may also be used heated to 140 deg F. Concentrations vary between 2 and 8 oz per gal of water, depending upon the method of application. These include automatic spray, foam spray method, and with bucket and brush. *Oakite Products, Inc., Dept. RLC, 19 Rector st., New York 6.*

Air Brake Components

The J-1 relay valve employs O-Rings and diaphragms which permit weight reduction and provide more sensitive and positive performance with simplified maintenance. It is designed for application to present B-3 relay valve brackets.

A high-capacity main reservoir safety valve, the Type H-1, is designed to operate over long periods under severe operating conditions. It employs many parts used in the D-24-B Feed Valve which simplifies stocking of maintenance parts. *Air Brake Division, Westinghouse Air Brake Company, Dept. RLC, Wilmerding, Pa.*

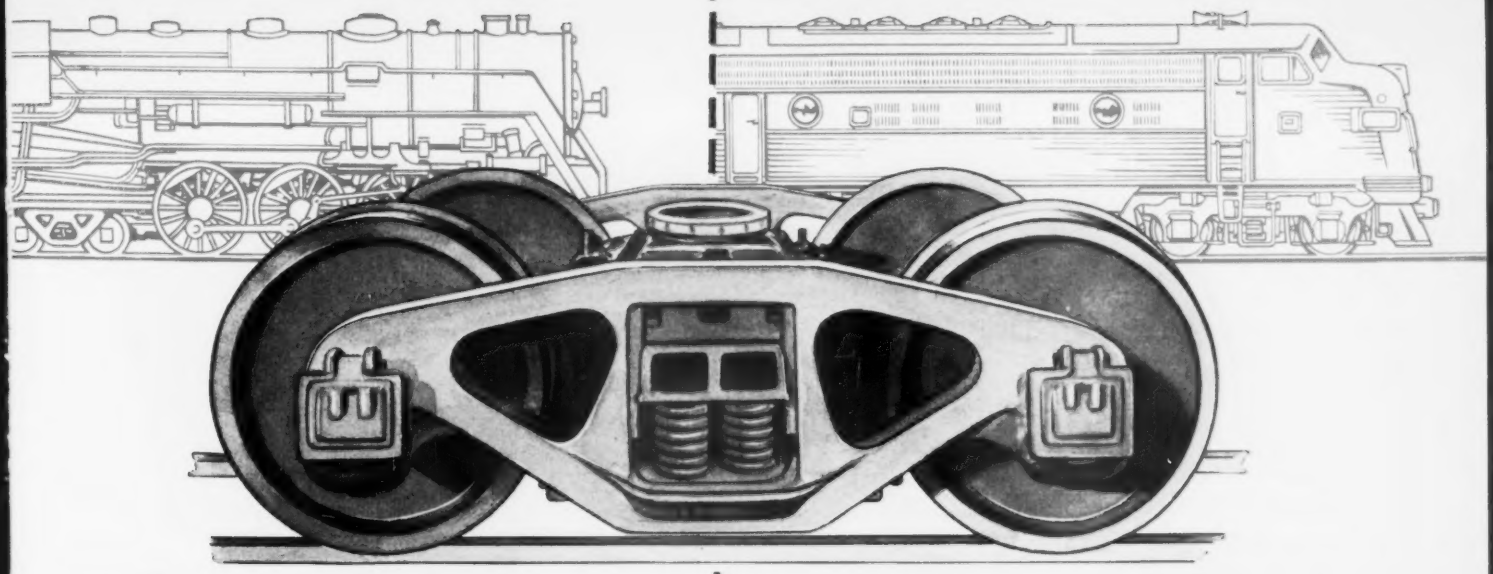
Diesel Servicing Truck

This truck carries fuel oil, lube oil and sand to yard locations. It is reported that the driver, who also operates the unit, can completely service a switcher in about twenty minutes.

The capacity of the unit, which is mounted on a standard chassis equipped with power steering, is one cubic yard of sand, 1,600 gallons of fuel oil and 25 gallons of lube oil in five gallon cans.

The fuel tank is equipped with a pumping unit driven by the truck engine. Fifty feet of fueling hose is supplied

(Continued on page 8)



The Old and the New...

..from waste to → JBS ACME JOURNAL LUBRICATORS

A Great Step Forward!

With waste gradually being discontinued in journal lubrication, the change-over to a better type of lubricator raises certain questions: what type should it be; what qualities should it possess; what kind of a performance should be expected of it? To help you decide, consider what the JBS Acme Lubricator offers and compare it with any other lubricator. JBS Acme alone has the exclusive all-wool quilted core* which retains many times its own weight in oil reserve. Heavy chenille loop pile surfaces assure an ample supply of filtered oil at all times. JBS Acme Lubricators are unaffected by temperature changes and wick AAR specification car oil even at 45° below zero in road service tests. JBS Acme Lubricators require no modification of the standard journal box, are designed to hold their position in the box, and assure better performance with less servicing.

Write Today for Detailed Information and Folder

- ★ Retains oil up to 4 times its own weight
- ★ Requires no modification of journal box
- ★ Wicks AAR specification car oil even in coldest weather
- ★ Assures better performance with less servicing
- ★ Has exclusive all-wool quilted core*
- ★ Reinforced for extra wear
- ★ Cannot glaze
- ★ Readily reclaimed

See us at the Allied Supply Convention in Chicago, September 15, 16, 17 and 18 in Booths 119, 120 and 121

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*Patent applied for

JOURNAL BOX SERVICING CORP.

"30 Years in Car Lubrication"

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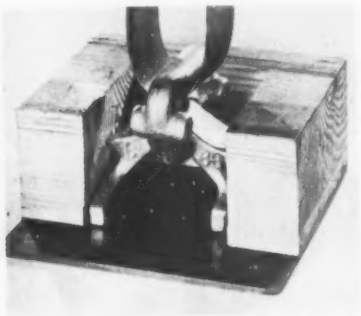
EQUIPMENT . . NEW IDEAS—NEW USES

(*Continued from page 6*)

with hose reel mounted for easy access and withdrawal. Accurate record of fuel oil supply to each locomotive is provided by a meter. The sand tank has a hose connection for coupling to locomotive air line which furnishes pressure to blow the sand into sand boxes. Sufficient hose is available to service boxes in all locations without moving the truck.

The manufacturer prefers that the railroad specify its own chassis for the truck. On this will be installed any combination of equipment for fuel oil, sand, or other servicing desired. *Farrell Manufacturing Company, Dept. RLC, Joliet, Ill.*



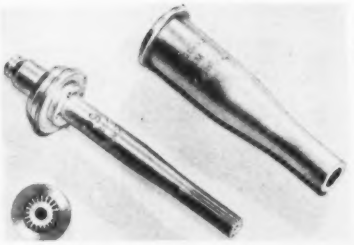
Flat Car Anchor

A new retractable hold-down anchor is said to feature a minimum size pocket required in decking and an anchor link, when retracted, which does not lie at bottom and become embedded in cinders, ice, snow or other foreign matter.

The anchor fulchrum is welded to the underframe, and it is said the full swivel action of the link provides maximum angularity for load attachment. The link will take standard 2-in. strapping or cable. *MacLean-Fogg Lock Nut Company, Dept. RLC, 5535 North Wolcott ave., Chicago 40.*

Cutting Nozzles

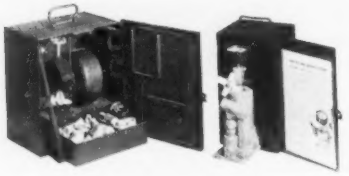
Increased flame cutting speeds are said to be possible with this line of Oxweld two-piece nozzles. Designed for flame



cutting with oxygen and fuel gases, each has from 12 to 20 extremely small outlets for preheat gases to increase heat transfer and produce a nearly solid ring of preheat flame. This is said to be ideal for shape cutting because of the uniform preheat regardless of the direction of the cut.

A divergent bore design boosts gas speed to 1,200 ft per sec to increase cutting speeds. Each two-piece nozzle consists of a brass internal section with finely grooved slots for preheat gases, and a heat-resistant copper cover. Only the external or internal section needs to be replaced.

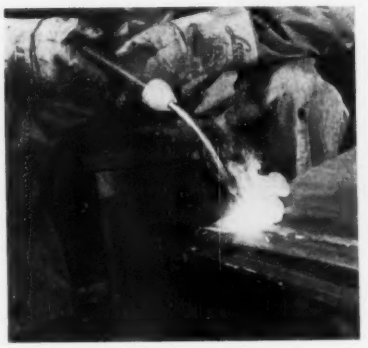
Two-piece construction makes cleaning easier and eliminates the need for cleaning wires or special tools. Nozzles are available for general duty cutting, scrap cutting, and high speed machine cutting. *Linde Company, Division of Union Carbide Corporation, Dept. RLC, 30 East 2nd st., New York 17.*



Diesel Nozzle Tester

Utilizing the basic fundamentals of a standard hydraulic jack, this precision instrument can be used for the testing of diesel engine nozzles and injectors. Rugged and simple in construction, any mechanic can follow the printed instructions for measuring injector opening pressures, checking spray patterns for uniformity and detecting other fuel-consuming or power-robbing conditions. The unit is easily carried within the shop or to road and field service calls.

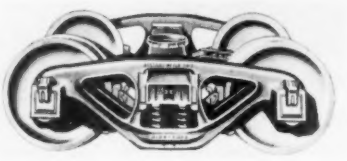
A hydraulic pressure gauge, 3-$^{11}/_{16}$ in. dial, 3000 psi capacity with 100 lb graduations, is standard equipment. Gauges of 5000, 7500, and 10,000 psi capacity are also available. The basic unit can be adapted to test valves, castings, controls, brakes, radial gasoline engine injectors, presses as well as other compact hydraulic systems. *Western Railroad Supply Company, Dept. RLC, 2428 South Ashland ave., Chicago 8.*



Hollow Weld Rod

A hollow wire welding rod which carries its own flux in its center is said to speed such specialized welding chores as hard-facing. The rod, designed for use in the manufacturer's own equipment, is supplied in spools for quick insertion. Reportedly, the weld metal, fed through the specially designed nozzle, can be laid down with far greater speed than with the fastest manual rods.

Its circular cross-section affords maximum resistance to bending or kinking as it is driven through a flexible shaft to the nozzle end. Two types of rod are produced. S/A manganese wire coils for steel buildup and repair work, and S/A 53 for hard-facing to resist wear and impact. *American Brake Shoe Company, Amsco Division, Dept. RLC, 230 Park ave., New York 17.*



Freight Car Truck

The Holland Ride-Ease truck, Style RE-2, has built-in bolster spring control. The friction system incorporated in this truck follows the same basic principle of direct acting, axially-loaded friction members employed in this manufacturer's ride stabilizer unit RS-1. The system is said to eliminate destructive friction

(*Continued on page 78*)

FACTORY! DALTON, GEORGIA

Photographed at Milwaukee Road Shops, Milwaukee, Wis.

Run fasteners quicker or remove them faster with

THOR Air Impact Wrenches

If you want more punch for the money and tools which will stand up long after others are in the repair shop—you'll choose Thor air impact wrenches every time. You'll choose Thor because you can set and remove fasteners faster. You'll choose Thor because there's no torque reaction to tire the operator. The Thor impact wrenches do the work—not the operator. And Thor gives you the widest selection of tools—$\frac{1}{4}$" to $1\frac{1}{4}$" bolt capacities—a variety of angle attachments and accessories.

Get Thor impact wrenches on the job today—watch your costs go down tomorrow. Call your Thor factory representative for a demonstration. Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.

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St. Louis • San Francisco
Seattle • Toronto, Canada
Export Division, New York City

Thor
PORTABLE POWER
TOOLS

Loomis Becomes AAR President

Daniel P. Loomis, chairman of the Association of Western Railways, has been elected president of the Association of American Railroads, succeeding W. T. Faricy, who has been elected chairman of the board. Mr. Loomis, as president, will serve as chief administrative officer.

Billing Repair Cards Simplified

The AAR calls atention to Circulars DV-1399 and 1399-A, approved at the 1957 annual meeting, which cover recommendations on simplified procedures to reduce cost of billing for car repairs. Many of these rule changes will appear in the next supplement to the Interchange Rules to become effective August 1, 1957.

On page 85 of Circular DV-1399, the new wheel and axle billing form is shown. Pending receipt of the new forms, the present forms can still be used by inserting only the information required by the new form and eliminating the remainder. Rule 96 changes as shown on pages 60 and 61 of Circular DV-1399, eliminate certain requirements for pricing billing repair cards under group billing.

Rubber Draft Gear Damage

The AAR advises that consignees are not always careful in controlling application of heat to hopper cars in freezing weather to remove lading.

As a result of fires underneath cars, cases have been reported of rubber draft gears heated to the extent that the rubber portion has been badly damaged and no longer in condition to absorb shocks due to coupling impacts.

The AAR will appreciate the help of member roads and private car owners if they will advise all their people—concerned with cars that must be thawed to unload the lading, the consignees, and other interested parties, to avoid heat in the area of the draft gear. Other portions of the car should receive consideration also, since damage can result to journal bearings and air brake equipment if proper care is not provided.

Brake Law Amendments Trigger AAR Rule Revisions

Legislation which would give the Interstate Commerce Commission authority to prescribe rules for power or train brakes has been considerably changed. On July 1, 1957, the Senate Committee on Interstate and Foreign Commerce reported senate bill 1386 favorably, with two significant amendments.

The first of these requires the ICC to adopt and put into effect as rules for power or train brakes, the so-called Red Book rules of the AAR "with such provisions as may have been adopted prior to the enactment" of the amendatory bill. This was in lieu of the original provision that would have required the Commission to prescribe such rules after hearing (Railway Locomotives and Cars, May 1957, page 52). The report on the bill stated that "the railroads are expected, in making revisions in the rules, to exercise prudence and sound judgment" and further stated "the Committee has confidence in the railroad's willingness to revise the rules on a basis that will serve the public interest."

The second amendment was the addition of a proviso that states, "Provided, however, that such rules or standards or instructions or changes made therein shall be promulgated solely for the purpose of achieving safety." The statement on this point is also significant. The report states:

"The fear has been expressed that the rules and regulations for power brakes authorized by S 1386 might be used to limit train length for economic rather than safety reasons. Such is not the intent of the bill. Its terms are to be administered, if they become law, to achieve safety and for no other purpose."

In considering this problem, the

(*Continued on page 14*)

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE AUGUST ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road and builder	*No. of units*	*Horse-power*	*Service*	*Other detail*
CANADIAN NATIONAL:				
General Motors Diesel	17	—	Passenger	———
	80	—	Road switchers	———
	19	—	Yard switchers	———
Montreal Locomotive Works	30	1,800	Road switchers	———
Electro-Motive	2	—	Road switchers	For Central Vermont.
Alco Products	2	—	Yard switchers	For Grand Trunk Western.

FREIGHT-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Cap., tons*	*Other detail*
AMERICAN REFRIGERATOR TRANSIT CO.:				
Pacific Car & Foundry	50	Mechanical refrig.	70	Estimated unit cost, $26,500.
	150	Insulated	70	Equipped with DF loaders. Estimated unit cost, $16,500. Delivery of 200 cars scheduled for first quarter 1958.
BALTIMORE & OHIO:				
Pullman-Standard	300	Gondola	70	———
	25	Covered hopper	70	———
CENTRAL OF GEORGIA:				
American Car & Fdry.	500	Triple hopper	70	Cost, $4,150,000. Being delivered at rate of 25 cars per day.
CHICAGO, ROCK ISLAND & PACIFIC:				
Pullman-Standard	400	Gondola	70	———
	150	Box	50	100 with 15-ft doors; 50 with 12-ft doors. Delivery of 550 cars scheduled for first quarter 1958.
MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE:				
Pullman-Standard	75	Covered hopper	70	For September and December delivery.
NORFOLK SOUTHERN:				
Bethlehem Steel	30	Hopper	70	Unit cost, $8,700. For December delivery.
NORTHERN PACIFIC:				
Company shops	450	Box	—	50-ft double-door.
	50	Insulated box	—	With DF loaders.
WESTERN MARYLAND:				
Bethlehem Steel	500	Hopper	70	Delivery of 550 cars to begin in
Greenville Steel Car	50	Gondola	70	January.
WESTERN PACIFIC:				
Pullman-Standard	30	PS-2 covered hopper	—	2,003 cu ft cap. Unit cost, $8,930.
	10	PS-2 covered hopper	—	2,893 cu ft cap. Unit cost, $10,600. Delivery of 40 cars expected first quarter 1958.

PASSENGER-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Other detail*
BALTIMORE & OHIO:			
Budd Co.	2	"Siesta coaches"	Delivery scheduled for early 1958.
CANADIAN NATIONAL:			
Budd Co.	1	RDC-3	Cost of 2 cars, $360,000. Delivered in
	1	RDC-2	August.

NOTES

FREIGHT CARS:

Northern Pacific—Converting 25 box cars into flat cars for piggyback service. Estimated cost of conversion, being done in company shops, $1,600 per car.

Virginian—Ordered materials for construction in company shops of 500 70-ton hopper cars during second quarter of 1958.

now comes

Oilgard

TO REPLACE THE CONVENTIONAL INADEQUATE DUST GUARD

it was found after appropriate testing that OILGARD is an ***amazingly effective prevention against the loss of oil*** *from the rear of journal boxes.*

"The inner ring floats with each movement of the axle and thereby eliminates the wear and crushing damage which ordinarily occurs with conventional designs of dust guards."

Holds the free oil in the journal box by establishing a retainer at the dust guard seat on the axle. It consists of a sheet metal frame which houses a plastic ring—an EFFECTIVE fit in the housing and on the axle.

The material used in the ring is not affected by oil or the temperatures involved. Oilgard is based on AAR Drawing No. SK-9855.

Don't fight the axle—fight the oil!

Oilgard's effectiveness is due to the fact that it doesn't resist the axle movement. The ring floats with the axle, but maintains a constant oil-stop contact within the metal frame.

Oilgard

BECK & BLATCHFORD, Inc.

80 East Jackson Boulevard Railway Exchange Building
Chicago 4, Illinois • HArrison 7-5424

GOODYEAR AIRFOAM AND FLOORING • MOHAWK CARPETS • COLLINS & AIKMAN FABRICS • FLINTKOTE PROTECTIVE COATINGS • GARLAND CUSTOM FURNITURE

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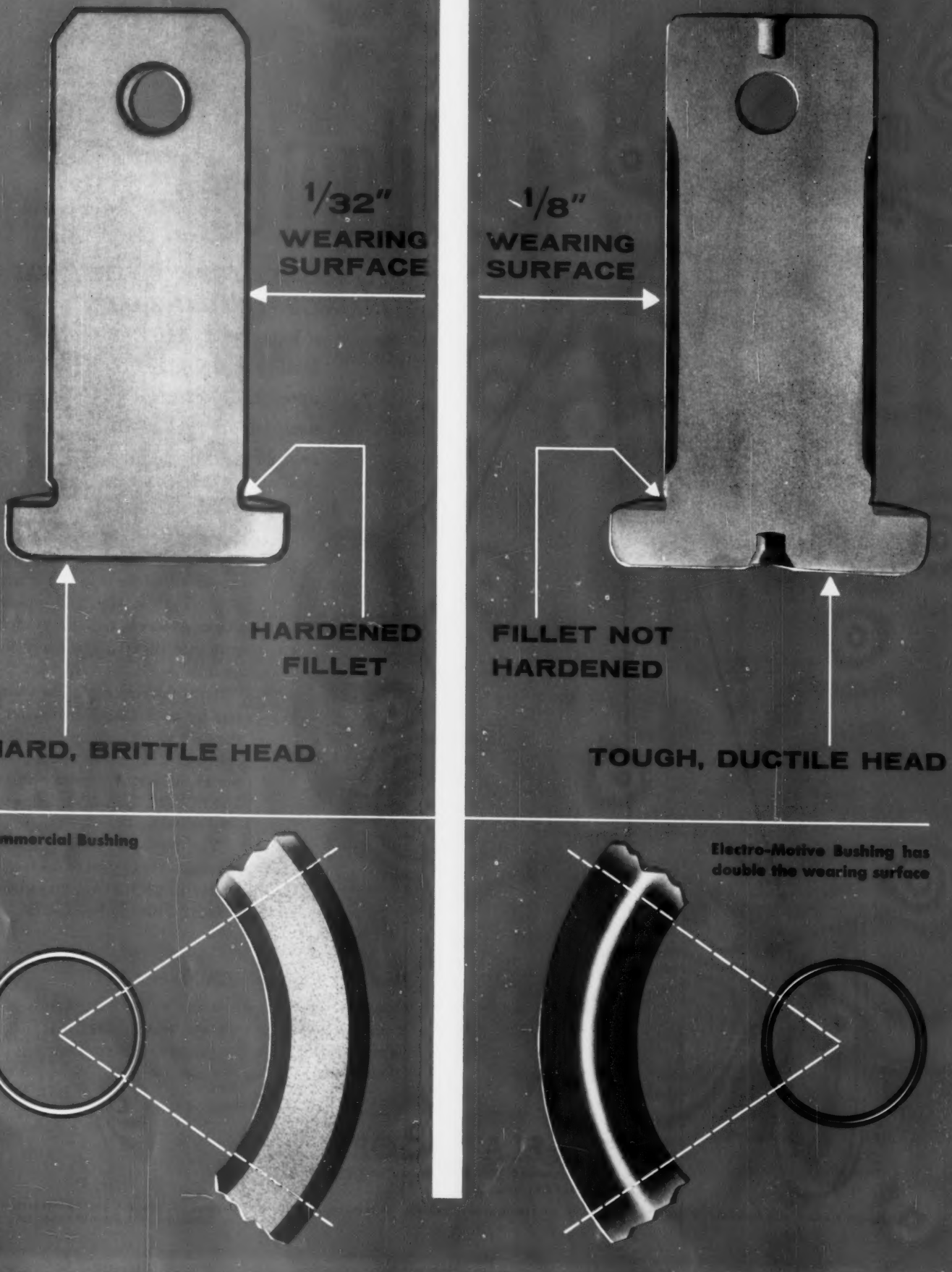
COMMERCIAL QUALITY

ELECTRO-MOTIVE QUALITY



Longer lasting . . . cost no more!

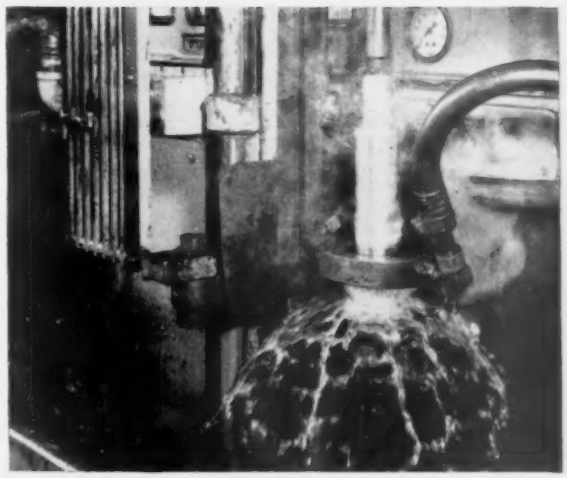
Why Electro-Motive Pins and Bushings cut replacements costs

Compare the photographs at left and you will see why Electro-Motive Pins and Bushings—on depth of wearing surface alone—will give you much longer service life.

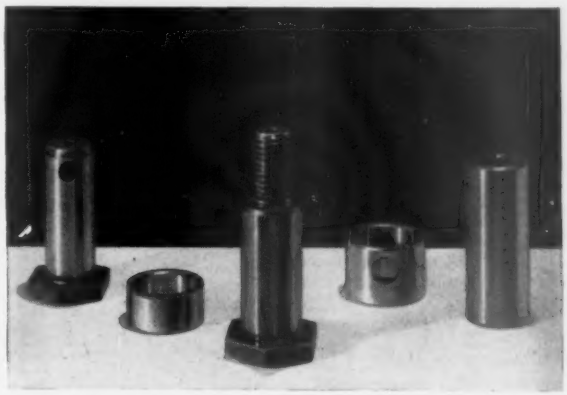
Note on the Electro-Motive Pin the wear-resistant surface runs only on the shank. This is purposely done because a pin must perform two functions: provide a bearing surface for the bushing and withstand severe shocks both from installation and service.

Thus, on the Electro-Motive Pin, the shank has a hard, deep bearing area while the head and threads are left ductile for better shock absorbing qualities, longer life.

Make a comparison in your own shops. Ask your Electro-Motive representative for a sampling of EMD Pins and Bushings for inspection and testing. You will see why the special hardening process employed in the manufacture of these parts brings extra service and savings at no extra cost.



Induction hardening makes the difference. In the induction hardening process, pins are passed through a high amperage electric induction coil which quickly heats them to optimum temperature. Water spray quickly quenches to eliminate distortion and scale.



Fast delivery from nine on-line warehouses. All nine of our warehouses carry stock of these pins and bushings in both current and fast-moving classifications.

La Grange, Illinois
Jacksonville, Fla.
Minneapolis, Minn.
North Salt Lake City, Utah
Los Angeles, Calif.
Halethorpe, Md.
Robertson, Mo.
Ft. Worth, Texas
Emeryville, Calif.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS
LA GRANGE, ILLINOIS
HOME OF THE DIESEL LOCOMOTIVE
In Canada: General Motors Diesel, Ltd., London, Ontario

GENERAL MOTORS LOCOMOTIVES

NEWS

(*Continued from page 10*)

general commit.ee noted the fact that under this bill changes in the rules for power and train brakes may be changed, after hearing, by the ICC. In connection with authority to make changes in the rules, there is the following significant statement in the report, "In making such future changes, the committee wishes to make it clear that the Commission should confer with and heed the advice of the AAR."

While action on S. 1386 and identical H.R. 5124 was pending before Congress, representatives of the AAR, committee on safety appliances and committee on brakes and brake equipment were conferring with representatives of the Bureau of Safety and Service of the ICC to prepare a revision of the Red Book that would be mutually acceptable.

As a result, a revised set of rules was referred to the General Committee of the Mechanical Division of the AAR for review, and were approved on July 24, 1957. The complete details of the revision have been submitted to letter ballot vote of the member roads.

Miscellaneous Publications

SERVICE MANUAL ON SPRAY EQUIPMENT. 405-page manual contains full parts list and general information on installation, operation and maintenance of DeVilbiss spray equipment. Replacement sheets to be available when requested, and new volume to be issued when necessary. *DeVilbiss Company, Toledo 1, Ohio.* Price, $2.50.

Personal Mention

Atchison, Topeka & Santa Fe.—Territory of W. W. LYONS, master mechanic, Colorado division, *La Junta, Colo.*, temporarily extended to include entire Western division, succeeding L. B. JOHNSON, appointed acting master mechanic, Plains division, *Amarillo, Tex*, succeeding J. T. SMITH on leave of absence. Mr. Johnson continues as master mechanic of the Panhandle division at *Wellington, Kan.*

Baltimore & Ohio.—W. T. MCCAHILL appointed road foreman of engines at *Grafton, W. Va.*

Belt of Chicago.—*Clearing, Ill.*: EMMETT C. HARVEY, superintendent, appointed general superintendent, with jurisdiction including locomotive and car departments.

Canadian Pacific.—*Montreal*: D. F. HANEY, assistant engineer of diesel equipment, appointed engineer of standards and methods, and B. B. WOODLAND, divi-

(*Turn to page 106*)

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
May, 1953	3,013,611	5,892	11,433	17,325	173,945
May, 1954	2,713,511	4,416	6,510	10,926	248,353
1955					
May	2,931,850	4,860	8,664	13,524	216,788
June	2,945,955	6,080	10,226	16,306	180,666
July	2,906,558	8,086	13,635	21,721	133,813
August	2,954,439	8,555	14,358	22,913	128,941
September	2,923,592	5,896	10,469	16,365	178,649
October	3,025,177	3,966	7,182	11,148	271,364
November	2,950,228	2,010	3,972	5,982	493,184
December	2,922,034	1,819	3,774	5,593	522,444
1956					
January	2,925,109	2,029	4,302	6,331	462,029
February	2,794,161	2,570	5,611	8,181	341,542
March	3,027,684	2,517	6,212	8,729	346,853
April	2,930,389	3,202	6,881	10,083	290,626
May	3,063,427	4,672	10,903	15,575	196,688
June	2,973,732	6,777	15,125	21,902	135,774
July	2,788,347	8,484	16,067	24,551	113,573
August	3,039,173	9,891	16,892	26,783	113,474
Sep ember	2,918,875	6,834	12,629	19,463	149,970
October	3,113,460	4,357	8,429	12,786	243,505
November	2,953,625	2,650	5,560	8,210	359,759
December	2,933,940	2,256	4,436	6,692	438,425
1957					
January	2,767,060	3,373	6,121	9,494	291,453
February	2,675,265	3,272	6,844	10,113	264,538
March	3,027,280	3,164	6,687	9,851	307,306
April	2,832,406	3,949	8,447	12,396	228,493
May	2,975,199	6,580	12,691	19,271	154,387

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of May		5 months ended with May	
		1957	1956	1957	1956
3	Road locomotive miles (000) (M-211):				
3—06	Total, Diesel-electric	37,868	38,686	183,689	186,599
3—07	Total, electric	687	772	3,510	3,669
3—04	Total, locomotive-miles	40,863	43,586	199,755	211,953
4	Car-miles (000,000) (M-211):				
4—03	Loaded, total	1,678	1,744	8,060	8,459
4—06	Empty, total	990	985	4,752	4,685
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6—03	Total in Diesel-electric locomotive trains	113,646	112,506	539,553	535,379
6—04	Total in electric locomotive trains	2,220	2,457	10,902	11,214
6—06	Total in all trains	123,644	127,076	588,633	607,039
10	Averages per train-mile (excluding light trains) (M-211):				
10—01	Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10—02	Loaded freight car-miles	43.8	43.0	43.0	42.9
10—03	Empty freight car-miles	25.9	24.3	25.4	23.7
10—04	Total freight car-miles (excluding caboose)	69.7	67.3	68.4	66.6
10—05	Gross ton-miles (excluding locomotive and tender)	3,228	3,132	3,145	3,077
10—06	Net ton-miles	1,478	1,445	1,429	1,410
12	Net ton-miles per loaded car-mile (M-211)	33.7	33.6	33.2	32.9
13	Car-mile ratios (M-211):				
13—03	Per cent loaded of total freight car-miles	62.9	63.9	62.9	64.4
14	Averages per train hour (M-211):				
14—01	Train miles	18.8	18.6	18.9	18.7
14—02	Gross ton-miles (excluding locomotive and tender)	60,200	57,493	58,840	56,869
14	Miles per diesel-electric unit day (M-240):				
14—01	Road freight units	212.3		212.6	
14—02	Road Passenger units	426.5		437.8	
17	Car-miles per freight car day (M-240):				
17—01	Serviceable	46.8	47.9	46.0	47.0
17—02	All	44.9	46.1	44.2	45.2
18	Average net ton-miles per freight car-day (M-240)	952	990	923	957
19	Per cent of home cars of total freight cars on the line (M-240)	110.6	111.9	111.0	112.1

PASSENGER SERVICE (DATA FROM I.C.C. M-213)

3	Road motive-power miles (000):				
3—06	Diesel-electric	19,591	20,315	97,027	101,372
3—07	Electric	1,156	1,239	5,943	6,405
3—04	Total	21,022	22,269	104,546	111,852
4	Passenger-train car-miles (000):				
4—08	Total in all locomotive-propelled trains	211,865	226,072	1,063,545	1,144,403
4—11	Total in Diesel-electric locomotive trains	196,156	205,648	979,615	1,035,029
12	Total car-miles per train-mile:	9.57	9.72	9.67	9.81

YARD SERVICE (DATA FROM I.C.C. M-215)

1	Freight yard switching locomotive-hours:				
1—03	Diesel-electric[1]	3,860,765	3,930,076	18,997,228	19,299,826
1—06	Total	4,024,287	4,224,870	19,850,337	20,715,958
2	Passenger yard switching hours				
2—03	Diesel-electric[1]	243,416	251,481	1,215,204	1,241,175
2—06	Total	271,951	285,498	1,358,858	1,416,773
3	Hours per yard locomotive-day:				
3—02	Diesel-electric	15.3	16.1	15.5	16.1
3—05	Serviceable	15.5	16.0	15.7	16.0
3—06	All locomotives (serviceable, unserviceable and stored)	14.3	14.6	14.4	14.4
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.66	1.68	1.70	1.69
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.79	.78	.79	.76

[1] Excludes B and trailing A units

Visit National's Headquarters, House on the Roof, Hotel Sherman

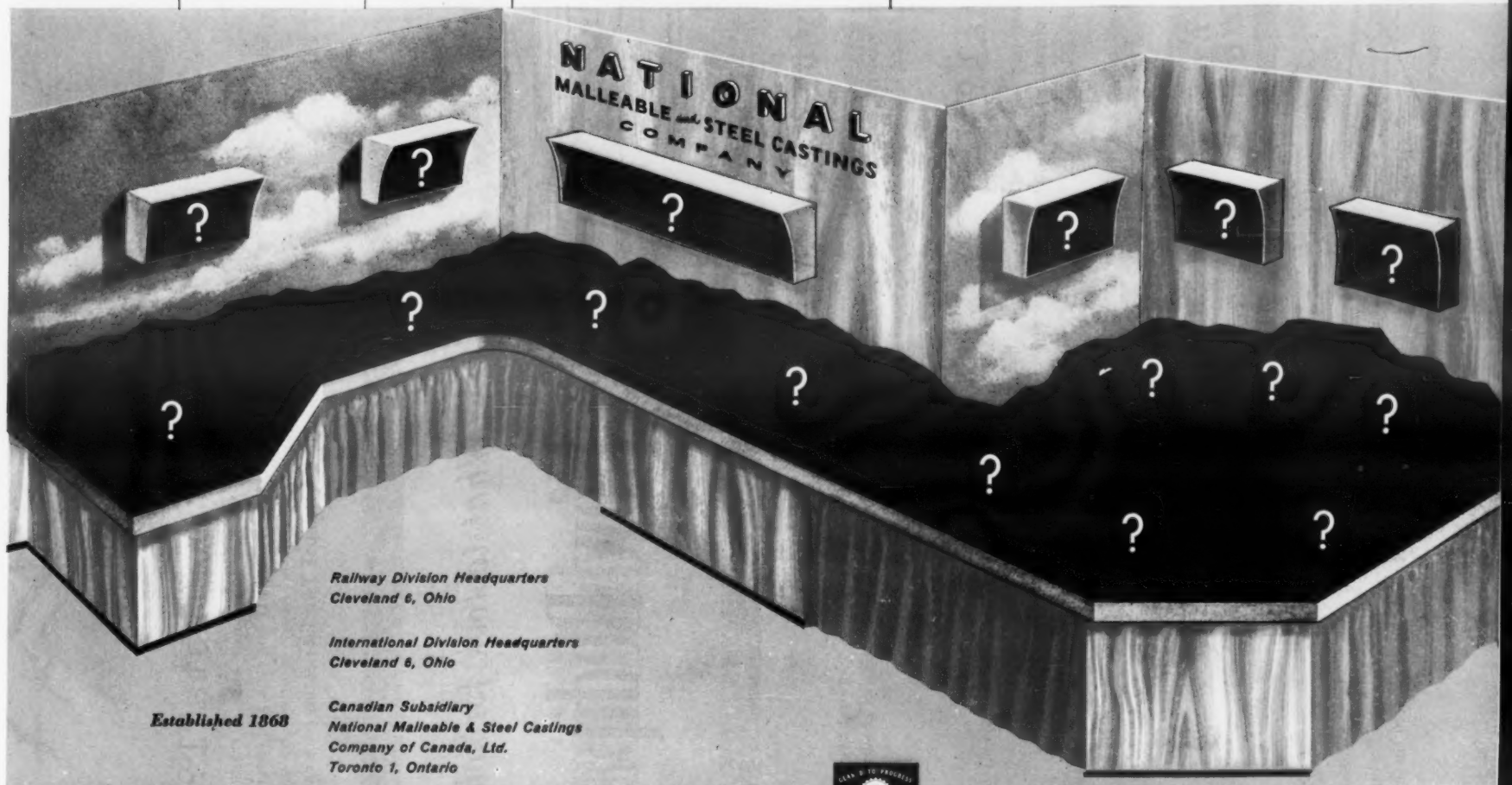
BE SURE TO SEE

the NATIONAL exhibit

BOOTHS 161 · 162

Allied Railway Supply Association Convention

SEPTEMBER 16 17 18 | HOTEL SHERMAN, CHICAGO



Railway Division Headquarters
Cleveland 6, Ohio

International Division Headquarters
Cleveland 6, Ohio

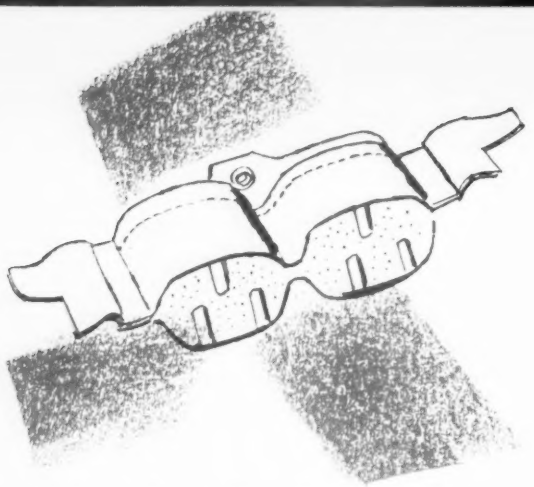
Established 1868

Canadian Subsidiary
National Malleable & Steel Castings
Company of Canada, Ltd.
Toronto 1, Ontario

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

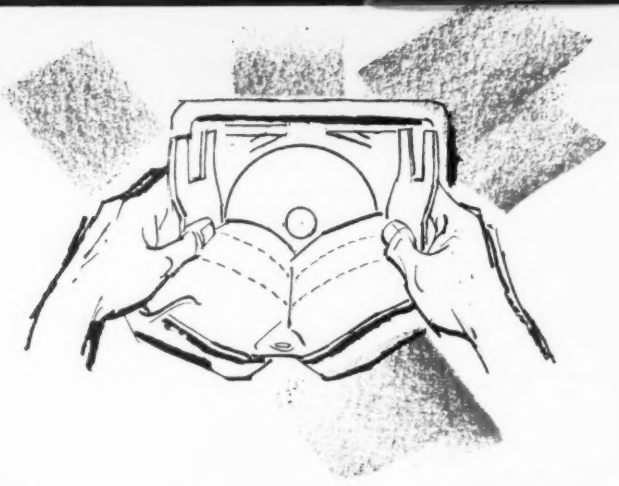
RPI MEMBER

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES



Is it simple?

Almost invariably, good design is simple design. Redipak Twin lubricating pads have no moving parts, no metal springs, no complicated gadgetry to wear out or break up. Just two simple foam neoprene cores encased in a sturdy cotton wicking cover.



Is it easy to install?

Does the proposed journal box lubricator take a trained engineer, a husky car-knocker, a twenty-ton jack and special tools for installation? Or can it be easily inserted, by any yard man, without tools? Redipak Twin lubricating pads can.

Is it thoroughly tested?

Redipak Twin lubricating pads have been rigorously tested and proven in one of the world's most modern journal bearing laboratories. Thousands of miles of road service are bearing out the accuracy of our testing.

Is it economical?

Due to their simplicity, Redipak Twin pads are inherently economical. Their greatest economy, of course, lies in their year-after-year savings in maintenance expenses.

What to look for when

See How Redipak®

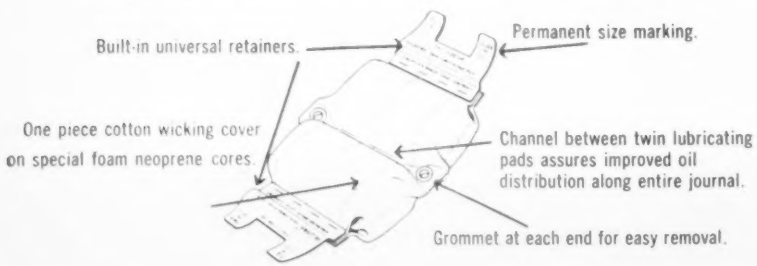
Is it durable?

In many tests, Redipak Twin pads have operated over 100,000 miles without noticeable wear or any sign of glazing. The covers do not lint.

Is it resilient?

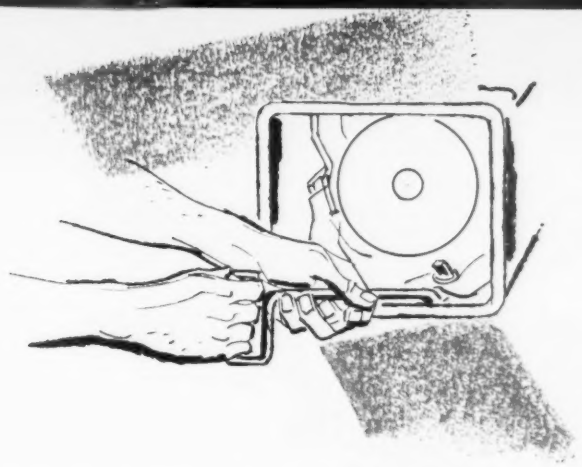
A successful lubricator must contact the journal at all times. Specially molded foam neoprene cores, compounded to our own specifications, assure superior resilience in every Redipak Twin pad.

Only Redipak® Twin Lubricating Pads Meet All These Vital Requirements!


Built-in universal retainers.
Permanent size marking.
One piece cotton wicking cover on special foam neoprene cores.
Channel between twin lubricating pads assures improved oil distribution along entire journal.
Grommet at each end for easy removal.

And in addition, Redipak Twin pads feature built-in universal retainers, which prevent shifting due to vibration and shock.

The more lubricating devices you test, the more you will agree with more and more roads: that the Redipak Twin pad is a practical, economical answer to the hot-box problem.



Is it easy to remove?

Can you remove the lubricating device readily, without bending it out of shape, breaking pieces off, or tearing it apart? With the Redipak Twin pad, you just hook the sturdy grommet on the side nearest you, rock it once or twice, and pull it out.

Is it cool running?

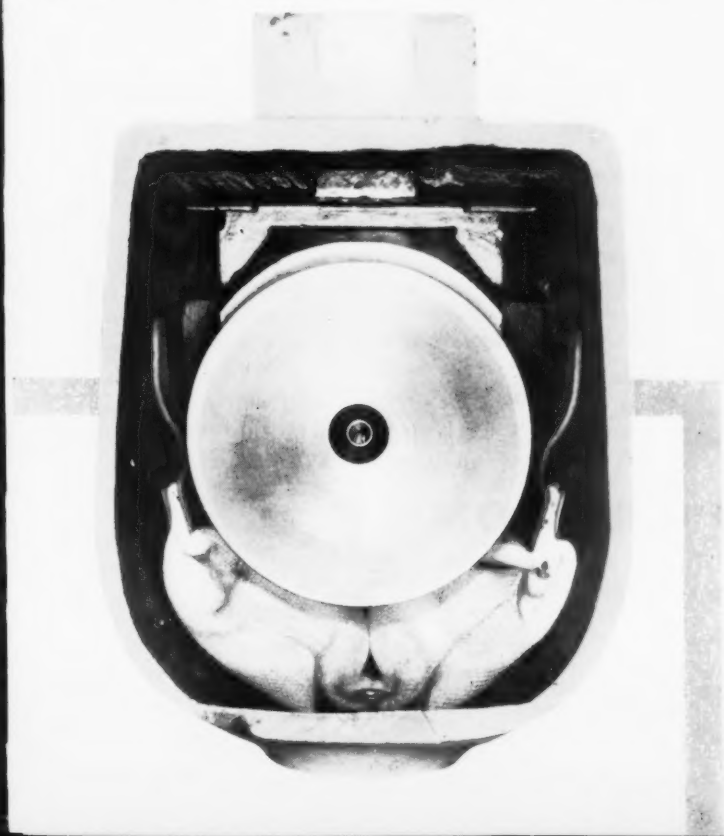
Bearings with Redipak Twin lubricating pads have operated as much as 50°F. cooler than waste-lubricated bearings under identical conditions. This cool-running characteristic and superior wicking action go a long way toward preventing hot boxes.

you test lubricating pads . . .

Twin Pads Measure Up!

Here are the important things you should look for in a lubricating pad—the vital characteristics that are so necessary to good journal bearing operation.

Check them and you will see why Redipak Twin lubricating pads are your best buy and your best bet for controlling the hot-box problem.



Does it hold enough oil?

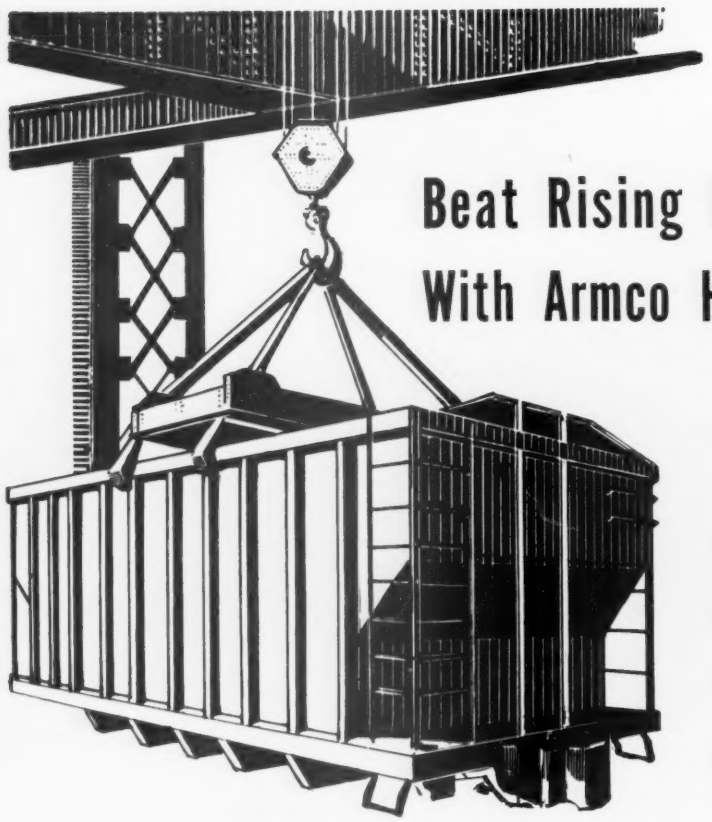
See How Much Oil Redipak Pads Soak Up!

Size	Weight	
	DRY	SATURATED
4¼ x 8	1 lb. 5 oz.	3 lb.
5 x 9	1 lb. 10 oz.	4 lb.
5½ x 10	1 lb. 15 oz.	5 lb.
6 x 11	2 lb. 6 oz.	6 lb.
6½ x 12	2 lb. 12 oz.	7 lb.

Brake Shoe

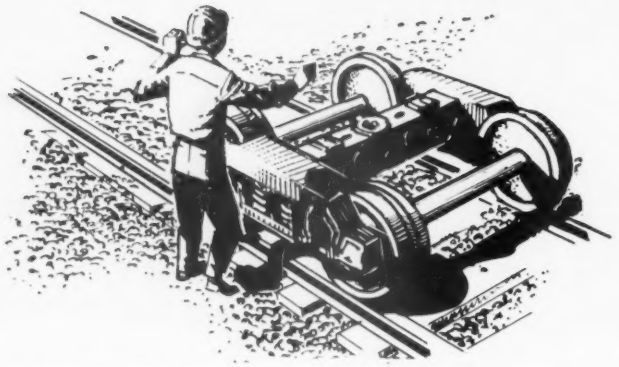
RAILROAD PRODUCTS DIVISION

530 Fifth Avenue • New York 36, N. Y.



Beat Rising Maintenance Costs With Armco High Strength Steel

. . . it extends car life, cuts down on repairs



Armco High Strength Steel keeps car maintenance costs low and cuts time-out-of-service in two ways:

1. Used in the same thicknesses as standard structural steel, it supplies greater strength to resist mechanical damage, shock and vibration—helps cars serve much longer before shop work is required.
2. This durable steel offers 4 to 6 times the atmospheric corrosion resistance of mild steel. The metal actually lasts longer in service.

Alternate Benefit

If you prefer to gain lighter car-weight and greater load-carrying capacity, Armco High Strength Steel offers a second revenue-boosting possibility. You can reduce thickness of car parts without sacrificing service life because of this metal's greater strength and corrosion resistance. Result: More cars per train.

Whether you are interested in reduced maintenance and longer car life, or bigger payloads, it will pay you to investigate low-alloy Armco High Strength Steel. Just fill in and mail the coupon for more information.

Armco Steel Corporation
1947 Curtis Street, Middletown, Ohio

Send me more information about Armco High Strength Steel.

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

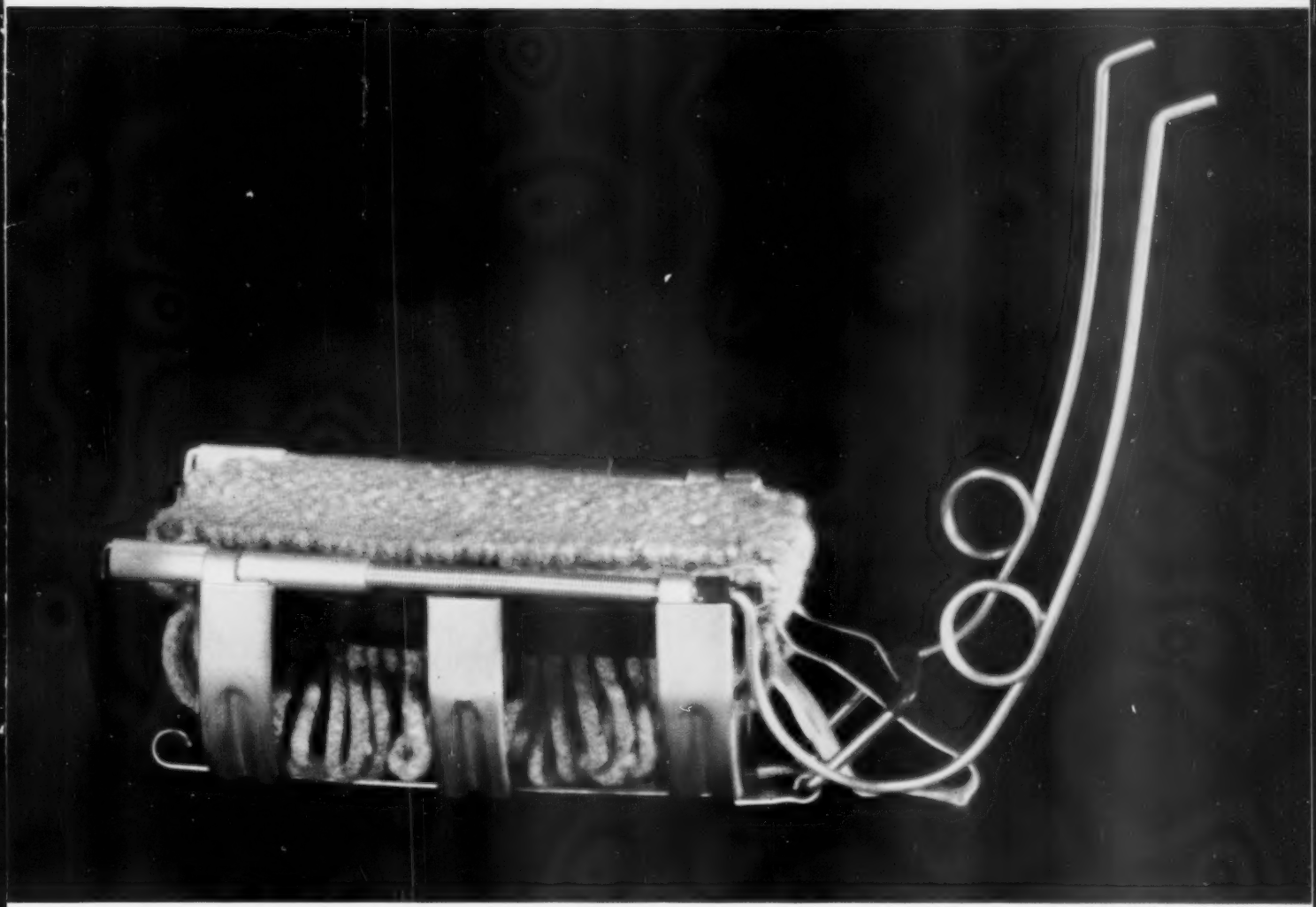
ARMCO STEEL CORPORATION

1947 Curtis Street, Middletown, Ohio

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

THE LUBRICATING SYSTEM THAT IS CHANGING THE THINKING OF RAILROAD MEN!

ROLIN



PATENTS PENDING

The ROLIN transforms any journal box into a modern, non-mechanical lubricating system in minutes.

The flexible cradle frame fits the curvature of any journal box; holds the pad snugly against the journal.

Spring action holds the cradle in positive position, yet allows the pad to follow journal movements and prevents shock being transferred to the cradle. This flexible design also permits jacking of the box for easy removal of bearings without touching the lubricator.

The unique cord in the pad consists of a tough thread woven around an absorbent inner lining. These endless wicks suspended below the cradle provide a rapid and continuous "pipeline" flow of oil; with a high absorption and retention capacity furnishing a tremendous additional oil reserve.

This is the ROLIN . . . designed and engineered to guarantee you freedom from waste grabs, linting, glazing, freezing, oil starvation and other causes of lubrication failures.

The ROLIN is now in general interchange service on 61 American railroads. For factual data and the truly interesting story of the development of this remarkable device, write:

THE rolin CORPORATION

80 EAST JACKSON BOULEVARD • CHICAGO 4, ILLINOIS • WEbster 9-3587

the new, improved **Adlake** electric lantern

...we invite you to compare it

Railroading itself dictated the improvements which are combined only in this new, lighter weight Adlake Electric Lantern. Think of these benefits in terms of the men who use lanterns:

- **Extruded aluminum bail, heat treated, with heavy coat of neoprene—a firm grip, resists oil, has ample arm clearance.**
- **Bail stays in position, but moves readily on new rivet attachment—tested for 15,000 operations without losing original tension.**
- **Stainless steel reflector—stays bright.**
- **At a flip of the switch, the lantern throws either a strong signal or a brilliant spot for reading car numbers.**
- **Holder in the cap for two spare bulbs.**

We invite you to make your own comparison, and when you have tried this lantern we believe you'll agree that it is the finest available. There's no obligation...write The Adams & Westlake Company, 1152 Michigan, Elkhart, Indiana.

The Adams & Westlake Company

Established 1857 • Elkhart, Indiana • New York • Chicago

Adlake

100th ANNIVERSARY 1857-1957

BIG, BURLY, BEAUTIFUL ...and oh, so *Vulnerable!*

Any care less than the very best, for Railroad Diesels, just doesn't make sense! Despite its size and cost your Diesel engine is exactly as susceptible to the ravages of dust, dirt, grit and other contaminants as the cheapest car engine.

Compare the care the motorist gives his $2000 car with that given a $2,000,000 Diesel locomotive! Today's car engine has the protection of a lubricating oil filter, a gasoline filter and an air filter... all with a high degree of engineering back of them.

On the other hand, there are still some railroads that are packing cans with waste to filter Diesel lubricating oil. Of course, the majority have a more enlightened appreciation of the menace of dust and dirt. Many employ WIX Engineered Filtration as standard practice.

WIX has invested thousands of man hours in research... the engineering has been done... the facts are here for your engineers to read. WIX is ready with proven filtering media for both fuel and lube oils, plus years of Railroad filtration "know-how". Write for full information today.

ENGINEERED FILTRATION

LUBE **wix®** FUEL

RAILROAD OIL FILTERS

WIX CORPORATION · GASTONIA, N. C.

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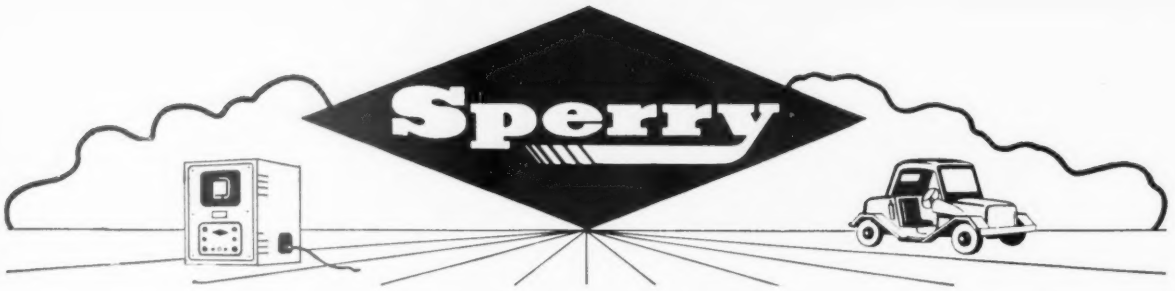
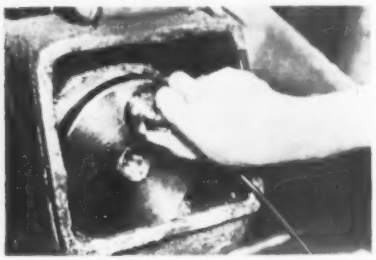


HELPING TO KEEP YOUR ROLLING STOCK SAFE

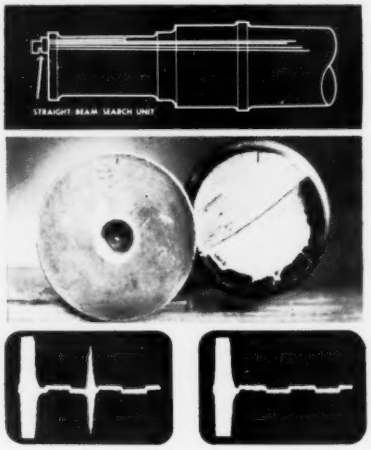
TEST 320 FREIGHT CAR AXLES A DAY AT 8.2 CENTS AVERAGE COST PER JOURNAL

Sperry Journal Test Cars in use on one of the country's leading railroads have achieved these results over more than a year's operations. Other accomplishments are equally impressive. Through January 1957, a total of 153,198 freight cars were checked. On these cars 328 cracked and defective axles were discovered. Findings to date average one faulty axle for every 467 cars inspected.



The Sperry Journal Test Car provides for fast, simple and positive journal testing. The operator drives the Test Car easily and rapidly alongside freight cars on the track; testing is done without leaving the car and one operator can check up to 80 cars daily.

HOW TO "DRIVE-TEST" WITH REFLECTOSCOPE®



The search unit, *placed on the end of a freight car journal, beams ultrasonic sound waves through the axle. Any defect, crack or flaw in the journal interrupts the sound beams and sends its reflection back to the Reflectoscope, where it is pictured on a cathode ray tube. The sketch shows an axle defect and its picture on the tube, which is mounted directly in front of the driver's seat.*

Mechanical Departments *gain benefits in time, labor and money from this speedy, sure method of journal testing. Your Sperry Sales Engineer will be glad to give you the complete details. If you wish, we will send you literature.*

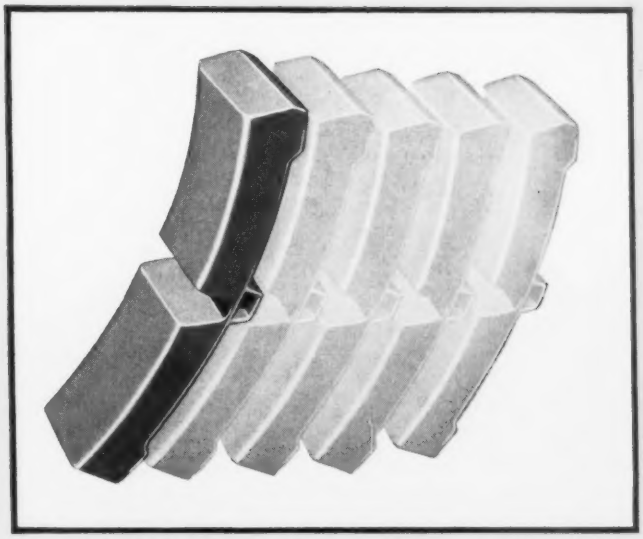
SPERRY RAIL SERVICE

Division of Sperry Products, Inc. · Danbury, Connecticut

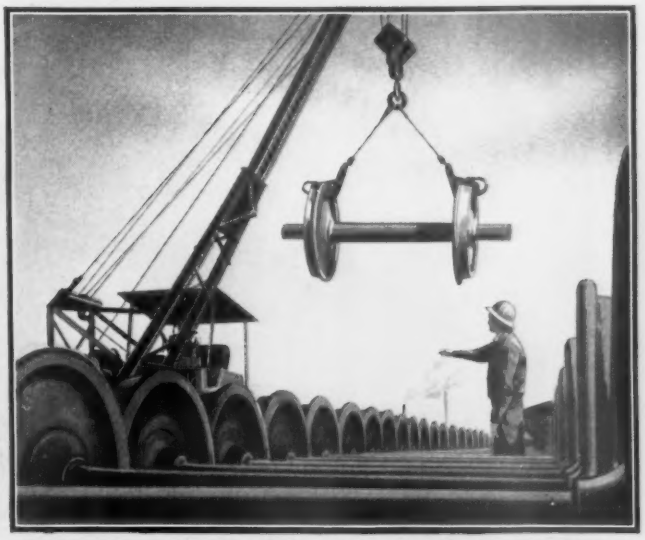
Supplying Railroads Exclusively

New York, N.Y., 60 East 42nd St. · Chicago, Ill., 80 East Jackson Blvd. · St. Louis, Mo., 818 Olive St.

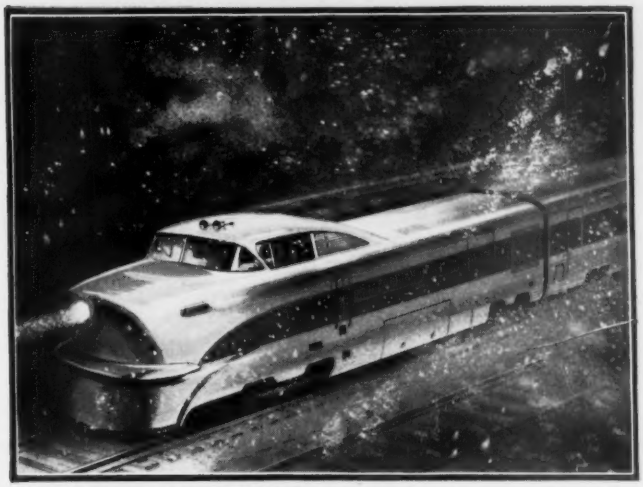
COBRA® SHOES offer 4 Major Advantages



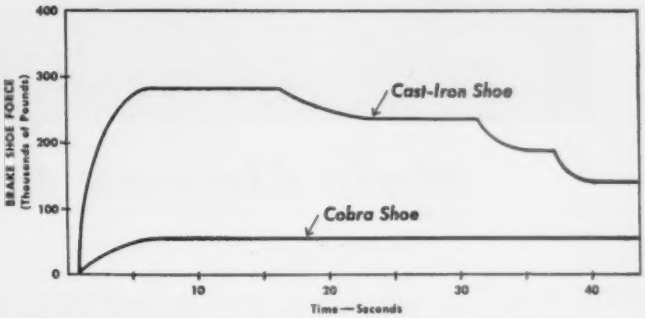
4 TO 5 TIMES THE SHOE LIFE—Millions of actual car-miles show that Cobra Shoes last four to five times as long as cast-iron shoes under matched conditions.



50 TO 100% LONGER WHEEL LIFE BETWEEN TURNINGS—With braking performance matched, wheel life between turnings has consistently averaged 50 to 100% more in favor of the Cobra Shoe.



ALL-WEATHER PERFORMANCE—Wet or dry—hot or cold—Cobra Shoes meet existing standards for stopping distances. Proved in actual railroad service.



60-80% LESS BRAKING FORCE—Comprehensive single car breakaway test shows the higher Cobra Shoe friction requires 60-80% less braking force than cast-iron shoes for equivalent retardation. Lower braking forces permit simplification and weight reduction of brake rigging and related components.

Result: *Savings up to $1400 per passenger car per year.*

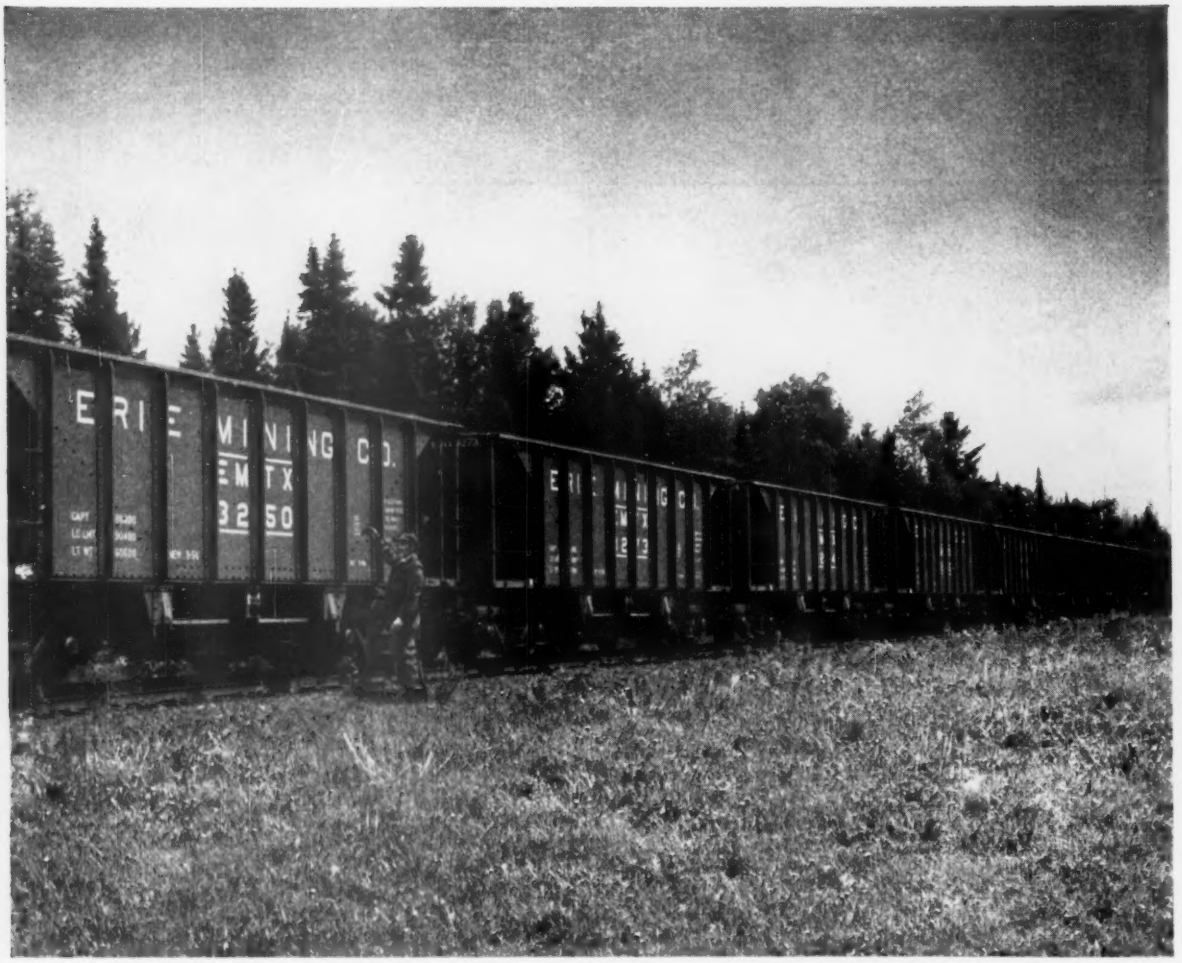
® Registered U. S. Trademark—Composition Brake Shoe

The COBRA® SHOE — product of the combined research facilities of

Westinghouse Air Brake Company
Specialists in Braking

Johns-Manville
Specialists in Friction Materials

RAILROAD FRICTION PRODUCTS CORPORATION, Wilmerding, Pennsylvania



Main Line on the Taconite Run

This stretch of lonely, uninhabited country lies between Hoyt Lakes and Taconite Harbor, Minnesota. The railroad, operated by Erie Mining Co., is used to haul taconite from the great processing plant at Hoyt Lakes to the harbor on Lake Superior, 73 miles away.

The 389 hopper cars required for the system were built by Bethlehem at its Johnstown, Pa., shops. Each of the cars has a capacity of 95 tons, and when level-full holds 1433 cu ft of load. The four-hopper bodies are of riveted-and-welded construction, and the cars are equipped with Type F couplers, 36-in. multiple-wear heat-treated wrought-steel wheels, forged-steel heat-treated axles, empty and load and clasp brakes. Items such as these are an aid to safe, dependable service, and they help reduce maintenance and repair expense.

The cars are excellent examples of what Bethlehem can build in open-top designs. When your own requirements call for something of this nature, by all means check with our engineering division. We can design the type of car you have in mind, or work from plans that you yourself supply.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

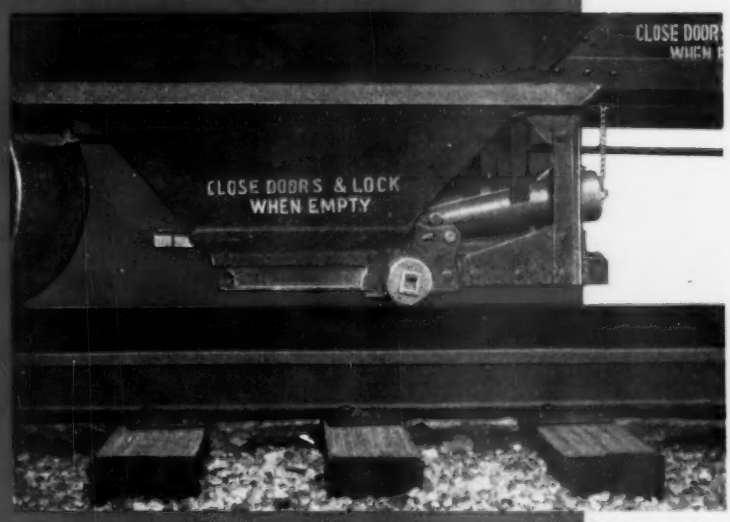
ANOTHER FIRST by Enterprise

a new concept in covered hopper car unloading

ENTERPRISE Pneumatic Outlet

(Patents applied for)

70-ton covered hopper car with Enterprise Pneumatic Outlets in combination with Enterprise Cast Steel Frames and Gates



Close-up view of Enterprise Pneumatic Outlet for covered hopper cars

To the long list of successful firsts since 1905—ballast cars, gondola cars, hopper cars, ore cars, covered hopper cars—ENTERPRISE now adds the Pneumatic Outlet for covered hopper cars.

This *newly* developed valve in combination with ENTERPRISE Cast Steel Frame and Gate makes covered hopper cars more versatile in a choice of two unloading systems—the conventional gravity flow bottom discharge, and by *pneumatic conveyor*. The car is unloaded, by *one man* using either system.

Responding to a challenge, the *Pneumatic Valve* was developed for sanitation, and for easy unloading of dry, granular, or powdered commodities. It can be applied to any existing covered hopper car equipped with ENTERPRISE Discharge Gates as well as new ENTERPRISE equipped covered hopper cars.

Full Particulars upon Request

ENTERPRISE RAILWAY EQUIPMENT COMPANY

50 E. Van Buren Street · Chicago 5, Illinois

7153

REPORT FROM A LEADING MID-EASTERN RAILROAD

Air-Maze oil bath air filter

cuts engine wear 45%

in 31-month test!

A LEADING railroad's 31-month test of an Air-Maze oil bath filter shows how maintenance costs can be cut and life of power assemblies increased. This test, made on an Alco 1600 hp road switcher, illustrates why so many top-flight railroads have switched to Air-Maze oil bath filters for air intakes on diesels in freight, passenger and switching service.

Here are the facts on filter maintenance:

"Regular checks of oil level and dirt in filter bowls indicated that a 3-month period between oil changes was entirely adequate for diesel engine protection. Filter operated 5 months before initial oil change was required."

"Once-a-year cleaning of Air-Maze oil bath filters provided clean air with no evidence of dirt being carried into intake manifold."

Here are the facts on engine wear:

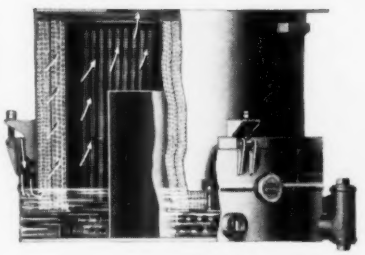
"One measured power assembly removed after 18 months—62,500 miles. Rings were free. Side clearance .008". Piston and liner in excellent condition. Maximum liner wear per 100,000 miles—.0016"."

Another power assembly removed at end of 31 months—141,827 miles. Ring side clearance—.016". Maximum liner wear per 100,000 miles—.0022" (.004" is considered normal).

Air-Maze oil bath filters cut diesel liner wear 45% during the 141,827 mile, 31-month test!

Panel filters formerly used on this railroad's switchers had to be cleaned weekly or bi-weekly. And with a loaded impingement type filter, dirt can jar loose, enter air intake and damage vital engine parts.

These facts about the Air-Maze oil bath filter's efficiency are equally important to railroad men. The oil bath filter is effective at *all* engine speeds—does not depend on high air velocity to do a top filtering job. (It works effectively with low pressure loss—is not affected by humidity or oil mist conditions.)



Extensive testing by an independent laboratory (selected not by us, but by one of our customers) brought this report: *Air-Maze oil bath filter removes 59% more fine Arizona road dust than the next best filtering device in use today.*

You can cut both filter and engine maintenance costs—and extend power assembly life. Now is the time to equip your diesel locomotives with Air-Maze oil bath filters. For further information, see your locomotive builder or write Air-Maze Corporation, Cleveland 28, Ohio.

Additional data furnished on request.

The biggest names in diesels are protected by Air-Maze filters.

AIR-MAZE

The Filter Engineers

DEDICATED TO PROGRESS P R I MEMBER

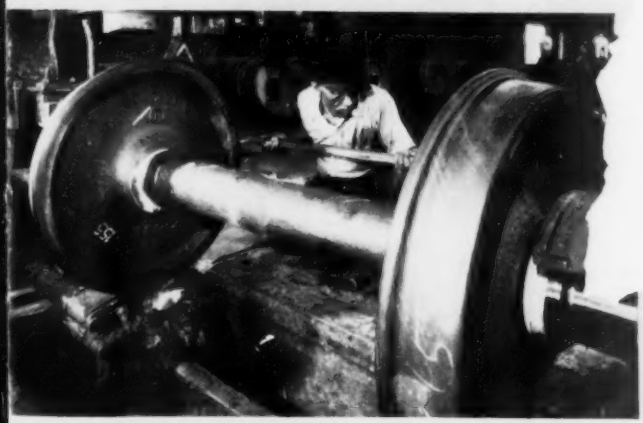
ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • PASSENGER CAR FILTERS

Tolerances are close! A Pullman-Standard operator marks the exact diameter of the bored wheel hub to facilitate its being mated with an axle that has the correct clearance for proper fit.

Wheel boring requires exceptional precision—making uniform quality of the wheel highly important, according to Pullman-Standard. Even the nature of the mating surfaces, their degree of smoothness, influences the operation!

Axle diameters are carefully measured and recorded after finish turning. Axle will later be fitted with a wheel hub that is precisely 0.006 to 0.007" smaller. Automatic handling equipment shift axles from machine to machine.

Burnished journal seats have the glass-like surface so important to long operating life. Electronic measurement finds the finish to be within a few microinches of perfect smoothness.



A superb fit of precisely machined components: A Southern cast steel wheel is mounted at a force between 80 and 120 tons and ready for a new Pullman-Standard freight car.

Putting Southern® Wheel Quality to Work . . .

in mass-production wheel mounting at Pullman-Standard

At Pullman-Standard Car Manufacturing Company's Bessemer, Ala., plant, Southern cast steel wheels have fitted perfectly into a highly mechanized wheel mounting technique that demands the utmost in wheel quality.

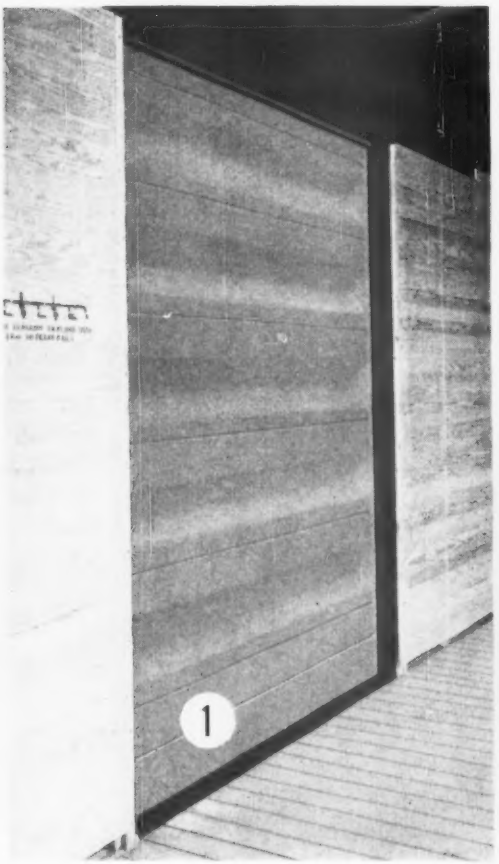
Wheel mounting, with minus tolerances of 0.006 to 0.007" and joining forces limited to 80 to 120 tons, is an exacting art made more exacting by mass production conditions.

One of the important foundations that Pullman-Standard relies upon to maintain precision and production is the uniform quality of Southern cast steel wheels—their accurately controlled hardness, their true concentricity and balance—factors that insure dependability and lasting performance.

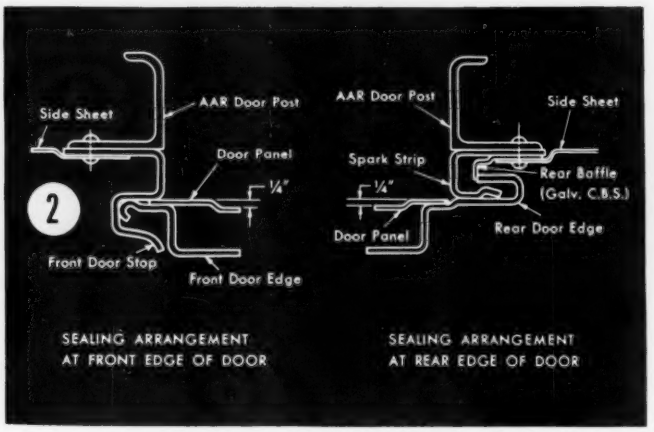
AMERICAN
Brake Shoe
COMPANY

RAILROAD PRODUCTS DIVISION
530 Fifth Avenue, New York 36, N. Y.

Pullman-Standard Box Car Side Doors



provide positive lading protection



1 SMOOTH INTERIOR PREVENTS DOOR DAMAGE TO LADING! Pullman-Standard design allows the door interior to be finished with a smooth, even surface. All framing members are on the exterior. Door fixtures are arc-welded to the outside surface. No bulges, ridges or sharp edges to cause lading damage.

2 SURFACE SEAL EDGES KEEP WEATHER AND DIRT OUT! The Pullman-Standard box car side door design insures a positive seal through a special baffle arrangement that brings about surface contact on all four edges of the door. Water, light and flour tests plus years of rugged on-the-road service have proved that this sealing mechanism positively shields lading from weather and dirt. Watershed top retainer and trough type door header provide additional weather protection.

- Sizes: 9' 11" or specified height. 6', 7', 8', 9', 15' or specified width.
- Heavy-duty combination lower panel and framing member of 5/32" corrosion-resistant, copper-bearing steel to withstand loading dock abuse.
- Other panels of .10-inch corrosion-resistant copper-bearing steel. Fixtures of forged or cast steel to withstand service abuse. All parts can be repaired by welding if accident-damaged.
- 5" rollers with durable cage type roller bearings insure trouble-free, easy operation.
- All welded, precision fabricated, embossed for strength.
- Corrosion pockets eliminated by welded assembly.
- Self-protecting design and fabrication excellence provide for long life, easy maintenance.

For complete details and specifications on the P-S Box Car Side Door contact your nearest Pullman-Standard Sales Office or write to the address below.

WORLD'S LARGEST BUILDER OF ROLLING STOCK

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY · SUBSIDIARY OF PULLMAN INCORPORATED

221 North La Salle Street, Chicago 1, Illinois

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this can be prevented.....

with *Statite*

and only USG® brushes have STATITE® permanent shunt connections

If you are having trouble with shunts jarring loose or being pulled out, we suggest you try USG Brushes with Statite. Statite is a permanent shunt connection needing no hammerclips. It can't be jarred out even under severe operating conditions, and will assure your electric motors of steady maintenance-free performance. Statite eliminates the need for riveted shunt connections. In addition, Statite shunt connections retain their original low millivolt shunt drop, cannot oxidize, and are unaffected by temperature extremes. USG Brushes are manufactured in a variety of types and sizes for all applications from fractional horsepower to diesel generator. Grades available include carbon and carbon-graphite, electrographitic, graphite, metal graphite, and silver graphite.

224

THE UNITED STATES GRAPHITE COMPANY

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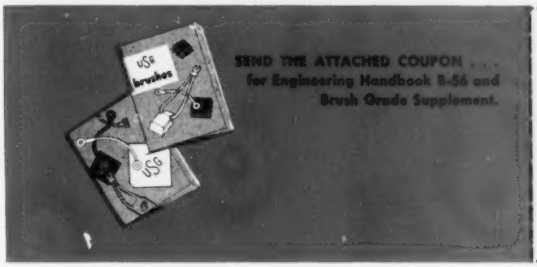

SEND THE ATTACHED COUPON . . . for Engineering Handbook B-56 and Brush Grade Supplement.

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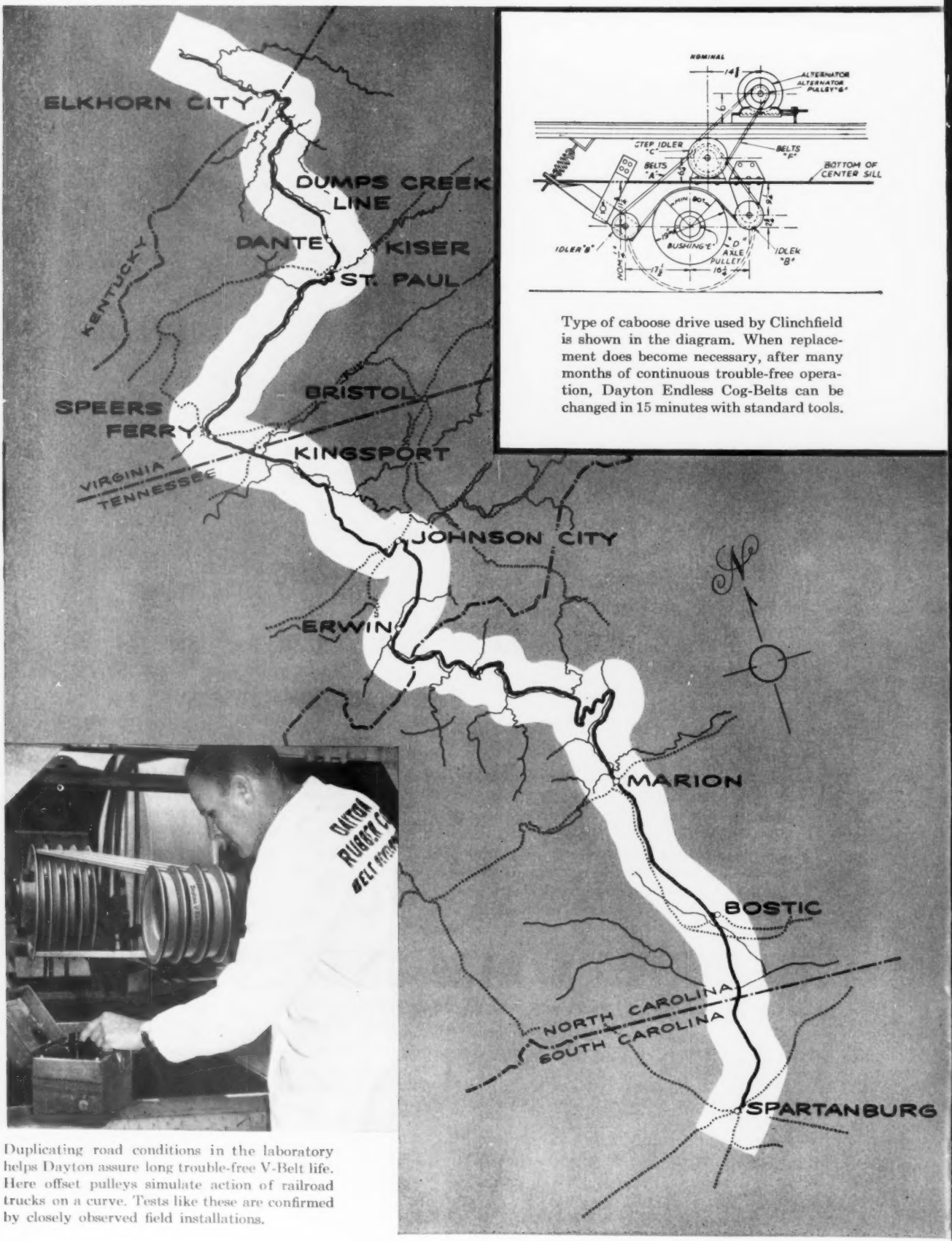


Type of caboose drive used by Clinchfield is shown in the diagram. When replacement does become necessary, after many months of continuous trouble-free operation, Dayton Endless Cog-Belts can be changed in 15 minutes with standard tools.

Duplicating road conditions in the laboratory helps Dayton assure long trouble-free V-Belt life. Here offset pulleys simulate action of railroad trucks on a curve. Tests like these are confirmed by closely observed field installations.

V-Belt drives give full Radio Power on America's most sharply curved Mainline Road

110 miles of curved mainline track; yet Dayton caboose drives deliver long, trouble-free low-cost service.

Radio communication—between Engineer, caboose and wayside—was part of the modernization program on the Clinchfield Railroad. Some method of driving the caboose generators was needed that would deliver full, continuous power at all times. It had to combine low initial cost with minimum maintenance.

An excellent proving ground for equipment, the Clinchfield twists tortuously for 276 miles through the mountains of North Carolina, Tennessee, Virginia, and Kentucky. (Connecting with the Atlantic Coast Line and the Chesapeake & Ohio Railway, it helps provide 3rd morning delivery of perishables from Florida to Detroit.) Longest single stretch of straight track is two miles. Of the 276 miles, 110 have some degree of curvature—many of them 10 to 14 degrees.

Clinchfield's engineering staff, headed up by Chief Engineer J. M. Salmon, Jr., Signal Engineer W. E. Prince, and assisted by Superintendent, Machinery P. O. Likens, studied both direct drives and several types of V-Belt drives. They knew their railroad and the demands it made on equipment. They chose the Dayton V-Belt Caboose drive for its relatively simple design.

With the help of Dayton Field Engineers the first installation was made in November, 1955. Experience showed a need for only minor adjustments. Every mainline train is now equipped with two-way radio. Forty drives were installed.

Service, according to the men of Clinchfield, is even better than expected. The drives have given the dependable, economical source of power needed. And despite operation on sharply curved tracks, they have provided continuous trouble-free service.

Dayton V-Belts can give you the same month-after-month low maintenance service. Help in the solution of your drive problems will be gladly provided by the Dayton Railway Field Engineer. Write The Dayton Rubber Company, Railway Division, Dayton 1, Ohio.

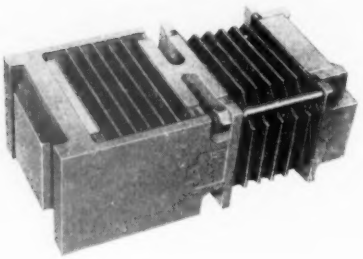
Dayton Rubber © D. R. 1957

World's Largest Manufacturer of V-Belts

The Dayton Rubber Co., Railway Div., Dayton 1, Ohio

Specialized Railway Representatives in Atlanta, Chicago, Cleveland, Dallas, Dayton, Moline, New York, San Francisco and St. Louis

We have NEVER received a
single report of failure
of a properly applied
National Rubber Draft Gear.
This is because the gear
is correctly designed.



NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868

Railway Division Headquarters
Cleveland 6, Ohio

International Division Headquarters
Cleveland 6, Ohio

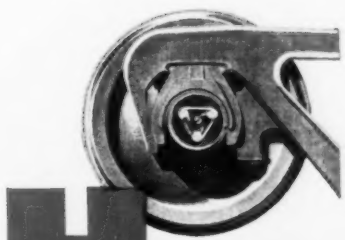
CANADIAN SUBSIDIARY
National Malleable & Steel Castings Company
of Canada, Ltd.
Toronto 1, Ontario

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES

Why there's much less wait for freight today

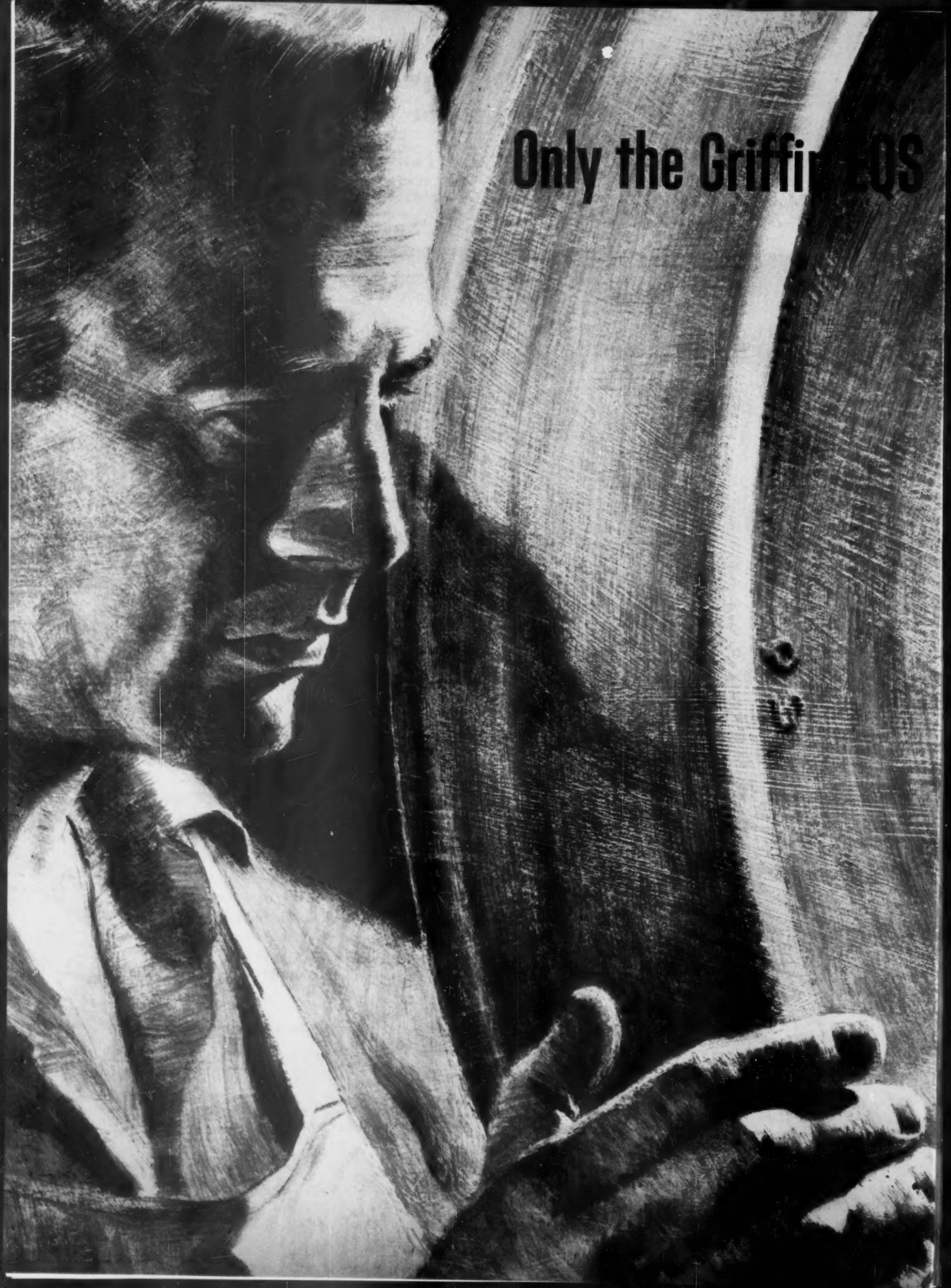
ONE REASON IS WELDED RAIL. Many will miss the rhythmic "clickity-clack" of wheels on track. But by eliminating troublesome bolted rail joints, welding helps trains roll smoother and faster, with far fewer delays due to track maintenance work.

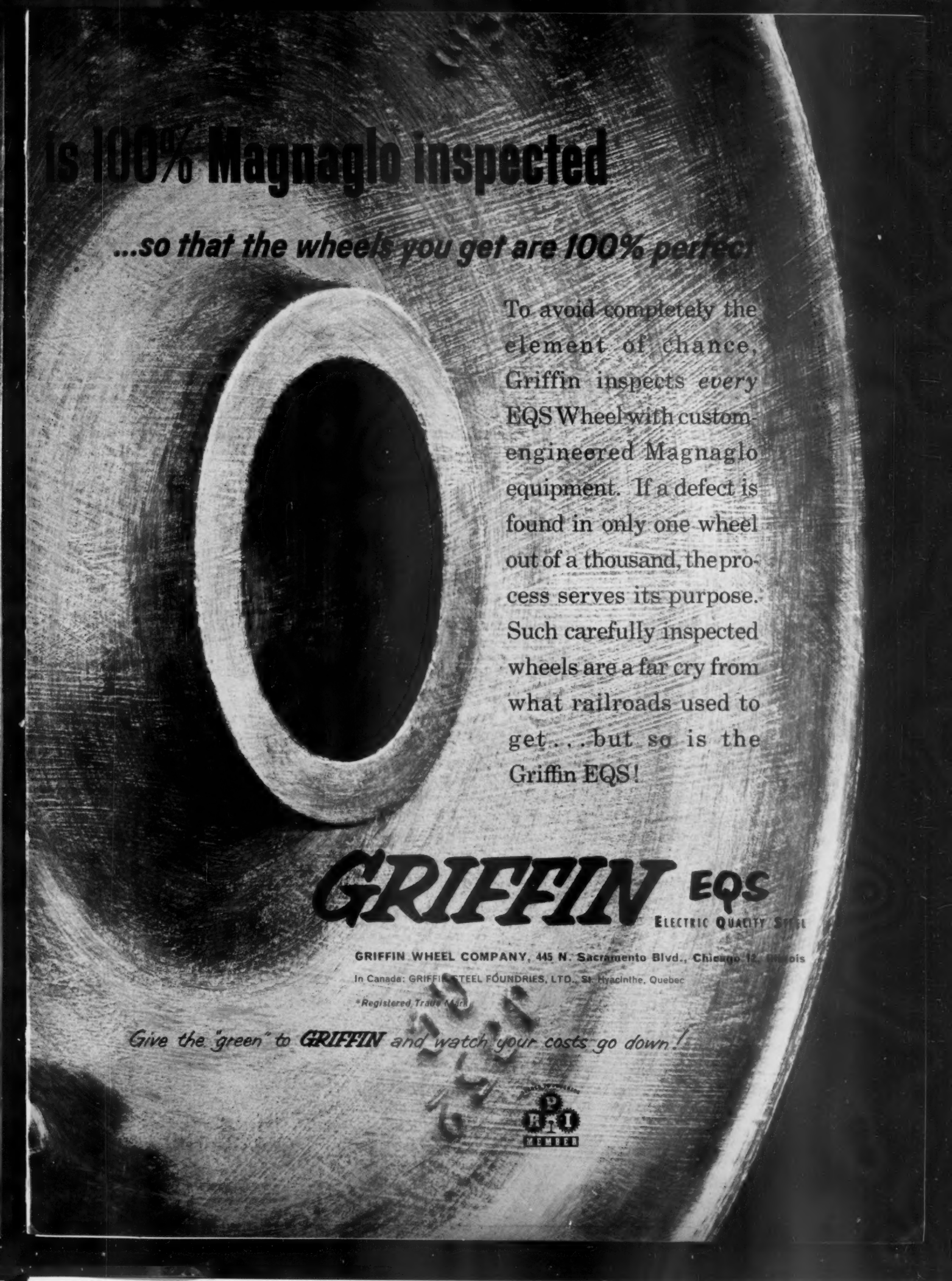
ONE MORE BIG REASON IS HYATT HY-ROLL BEARINGS for non-stop freight. No need to delay *this* car for bearing inspection or lubrication—he can see at a glance they're dependable HYATT Hy-Rolls! That means there's a 3-year lubricant supply sealed in. It means no more hotboxes. It means husky *straight cylindrical rollers* with extra load-carrying capacity for extra reliability. That's why 38 leading lines have already adopted the HYATT Hy-Roll as a basic part of their modernization programs —to help give America even faster freight service.
Hyatt Bearings Division of General Motors Corporation, Harrison, N. J.



Another GM GENERAL MOTORS contribution to railroad prosperity

HYATT HY-ROLL BEARINGS
FOR NON-STOP FREIGHT


Only the Griffi QS


is 100% Magnaglo inspected
...so that the wheels you get are 100% perfect
To avoid completely the element of chance, Griffin inspects *every* EQS Wheel with custom-engineered Magnaglo equipment. If a defect is found in only one wheel out of a thousand, the process serves its purpose. Such carefully inspected wheels are a far cry from what railroads used to get . . . but so is the Griffin EQS!
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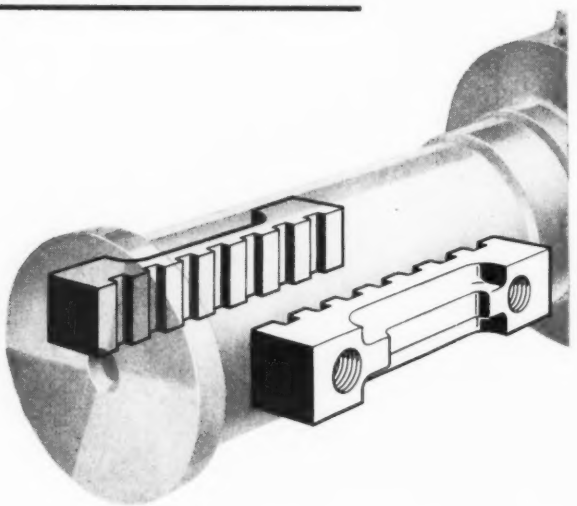
Give the "green" to GRIFFIN and watch your costs go down!
MEMBER

R-S JOURNAL STOPS

average better than 6,000,000 car miles per setout...

a FAR BETTER RECORD than

with any other journal box device!



Stabilization of bearing assembly provides a low-cost means of getting better bearing performance, FAST

MORE than 3,000 freight cars are now equipped with Magnus Journal Stops. These cars have chalked up more than 32,000 car months of service — with only 6 bearing failures. That's an average of better than SIX MILLION CAR-MILES per setout. And it's a performance record that you can't beat with any other type of freight car bearing, regardless of price!

Journal Stops make this kind of performance possible because they eliminate the major cause of bearing trouble — excessive fore-and-aft movement of the journal within the box. Bolted to the box on either side of the journal, they prevent axle displacement even under the most severe switching and braking impacts. Bearing, wedge and lubricator stay *in place* all the time — assuring an uninterrupted oil film, greatly prolonged bearing life and reduced wheel flange wear.

For complete information on R-S Journal Stops, write to Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

MAGNUS

Solid Bearings

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

Coal Turbine Nears Road Tests

Locomotive Development Committee's coal-fired gas-turbine power plant is nearly ready to move on from the laboratory phase of its development. This was predicted over a year ago in our previous report on the progress of this project (*Railway Locomotives & Cars, May 1956, p 53*). A new coal system and modifications altering the gas flow patterns within the turbine have been under test this year. With these tests completed, LDC will be in a position to project its future course. Already the Union Pacific has signed an agreement with Alco leading to the design of an actual locomotive.

"Right now there is more interest, here and abroad," stated Col. R. B. White recently, "in what this Committee has done and is now doing than at any time in the past." The chairman of the Locomotive Development Committee was commenting on developments and results obtained at the Dunkirk, N. Y., laboratory where the "final commercial acceptability test" of the coal-fired gas-turbine has just been concluded.

A dozen years of basic and applied research dealing with a multitude of problems have produced the power plant which has recently received favorable notice from the AAR Mechanical Division's Committee on Locomotives, from the Union Pacific, from electrical equipment manufacturers, and from the chemical and utility industries.

In 1945 the coal-fired gas turbine project was set up with the aim of continuing coal as a railroad fuel. The incentive then was that coal cost only one-fourth as much per heat unit as fuel oil. Price increases through the years have maintained this relationship right down to the present time.

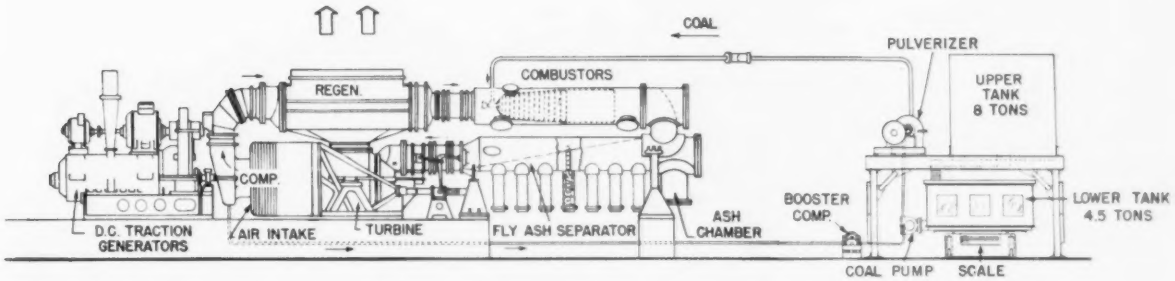
Originally the aim was for the locomotive to be fueled with run-of-mine coal; and it was to be able to burn this fuel. Mechanization of mining since 1945 has rendered the then universal run-of-mine specification almost obsolete today. Mechanized mining equipment indiscriminately digs dirt and rock along with the coal and has made large scale mechanical cleaning necessary.

Removal of this dirt and rock is done in high capacity preparation plants where coal is washed, dried and screened. Coal from large coal companies is all produced to specification with size, ash and moisture content closely controlled.

In 1953, LDC began to work toward the eventual use of an "air fluidized" coal system which would take ¼-in. by 0-in. or 3/16-in. by 0-in. coal from wayside storage and handle it through the combustion process in an air stream (*Railway*

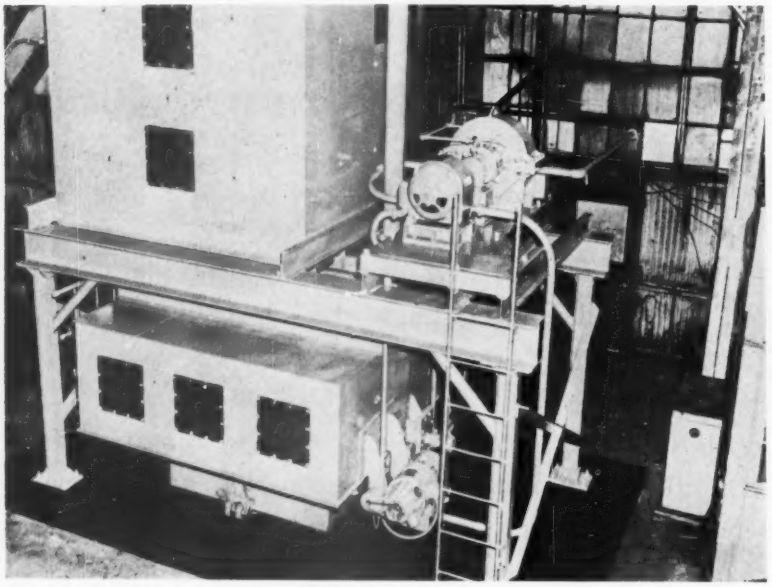
(*Continued on p 39*)

This Is The Way the Dunkirk Gas Turbine Is Arranged.



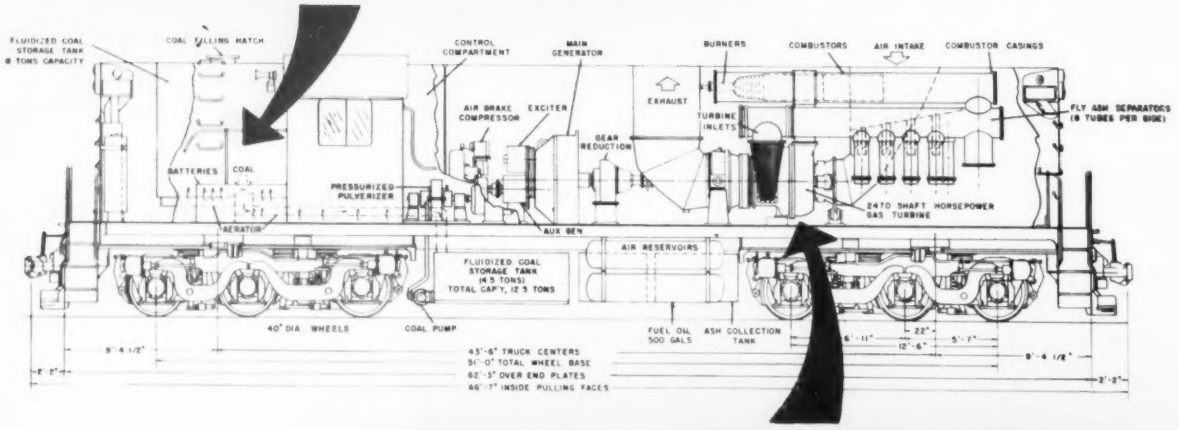
Coal handling and preparation equipment changes have altered the appearance of that part of the test plant at Dunkirk. Alterations in the turbine and ash separators have not changed the arrangement of the equipment at the left of this diagram.

Locomotive Components Are Being Tested



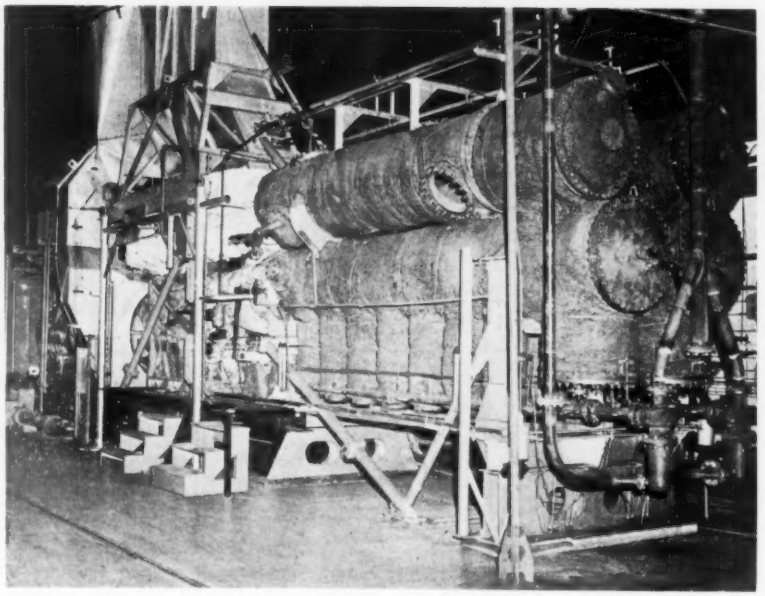
"Aerated" Coal System

Under test at Dunkirk has been a full size fuel system for the conversion of an Alco road-switcher from diesel to coal-fired gas turbine power. This includes the 8-ton fluidized coal-storage tank (top) and the 4.5-ton between-the-trucks tank (bottom). At the front of the lower tank is the LDC coal pump, and above it is the LDC-Riley pulverizer.



Turbine Modifications

LDC gas turbine and its auxiliaries have always been arranged to fit within the confines of a locomotive carbody. Present program has been testing modifications of the ash collection system, and changes within the turbine itself. Combustors and ash separators are at the right; to the left is the turbine under the regenerator and exhaust duct.



Locomotives & Cars, May 1956, p 55). What LDC is using for fuel is the same grade of coal purchased by electric utilities, a group now using 35 per cent of the national output. This is the cheapest coal available on a heat-unit basis.

During the 1955 test program—previously reported — the original bin-and-feeder coal handling system, built in 1951, was used. This system handled the small size coals without difficulty but it was unduly complicated, heavy, liable to failure, and expensive. The 1957 program has been testing the new design—an air-fluidized arrangement which duplicates the installation that would have to be made on a diesel road switcher if it were converted to the coal-fired gas turbine prime mover.

In this system, a 3/16-in. by 0-in. dried coal flows from aerated tanks without the need for mechanical conveyors (*like the system used in Airslide hoppers—Editor*). This fine coal is then metered and fed by the LDC rotary coal pump into the conveying air which carries it through the LDC—Riley pulverizer to the combustion chamber.

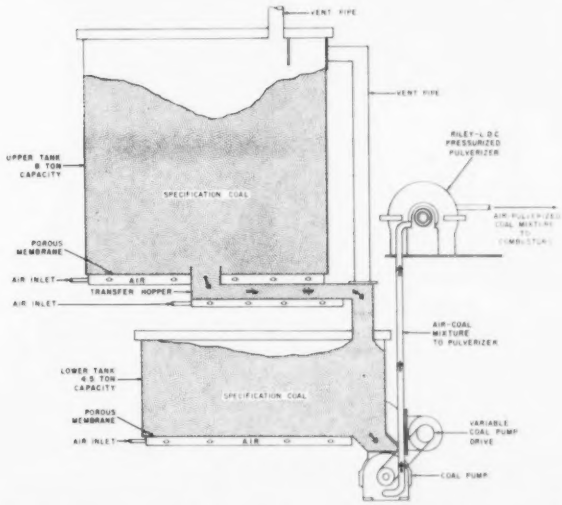
Evaluation of the 1955 test program led the Locomotive Development Committee not only to authorize alteration af the locomotive coal system, but also to authorize a partial reblading of the turbine. In earlier tests, a concentration of dust particles at the roots of the rotor blades had caused localized erosion. Conferences with the National Ad-

(*Continued on next page*)

Effectiveness of LDC-Riley Pulverizer

Sieve Size (Mesh)	Pittsburgh Seam "¼ Special"		Pochantas Seam "3 16 x 0 Slack"	
	As Received (Percent)	As Pulverized (Percent)	As Received (Percent)	As Pulverized (Percent)
Above 28	49.2	—	54.1	—
From 28 to 60	27.5	0.2	20.9	0.04
From 60 to 100	9.6	0.8	7.4	0.3
From 100 to 200	8.2	9.4	8.7	3.5
Under 200	5.5	89.6	8.9	96.16

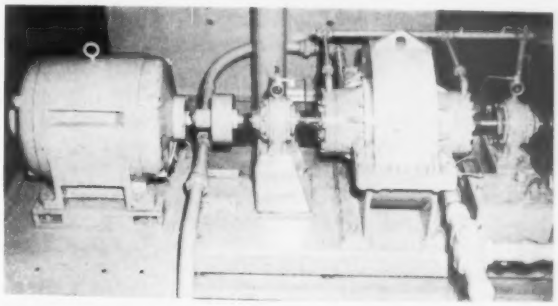
This Is How LDC "Fluidized" Coal System Works



Coal system under test duplicates what would be required for an actual locomotive application. LDC goal would be to make coal handling on and off the locomotive as simple as that for fuel oil.

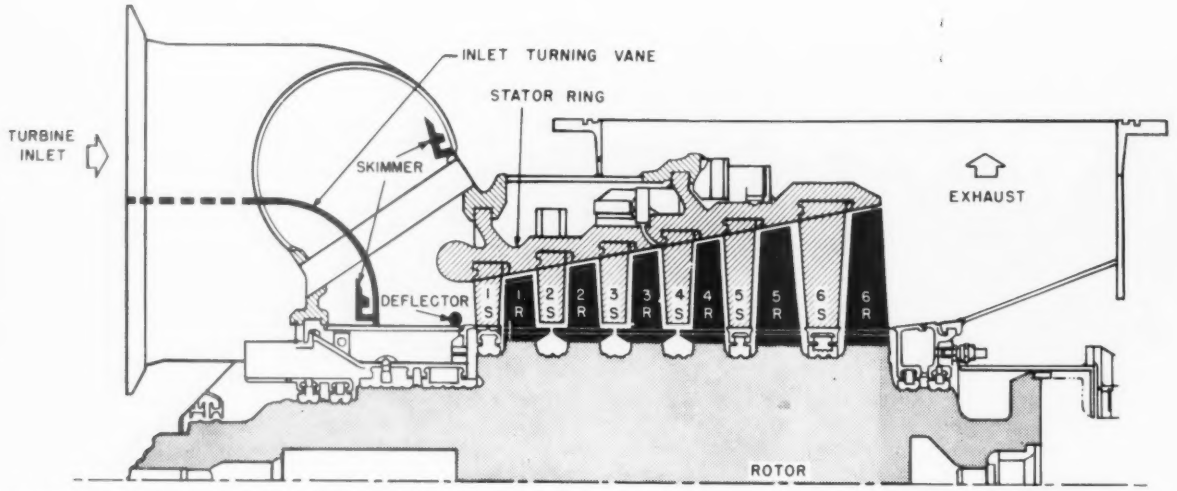
Membrane in the bottom of the lower fuel tank (above) provides passages through which conveying air carries coal to coal pump. Air fluidizing makes it possible to use tanks with shallow slope bottoms.

LDC has done much basic development work in the production, handling, metering, and collection of small solid particles. Chemical industries are interested in the LDC coal pump as a pressurized feeder for their processes, and oil refineries are already using the LDC ash separators (Dunlab tubes) for the collection of catalyst carried over in the refining processes. Even with all of this outside interest, the basic aim of this coal feeding and combustion system is the successful operation of the coal-fired gas-turbine locomotive.



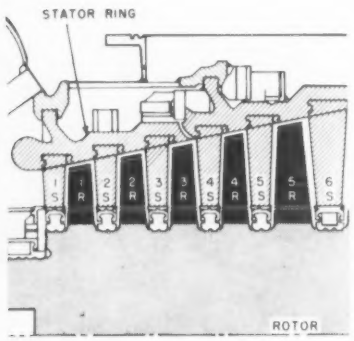
Pulverizer jointly designed by LDC and Riley Stoker has shown itself capable of producing an extremely high proportion of very small coal particles from the utility type fuels being supplied to it.

Turbine Modifications Are Proving Themselves

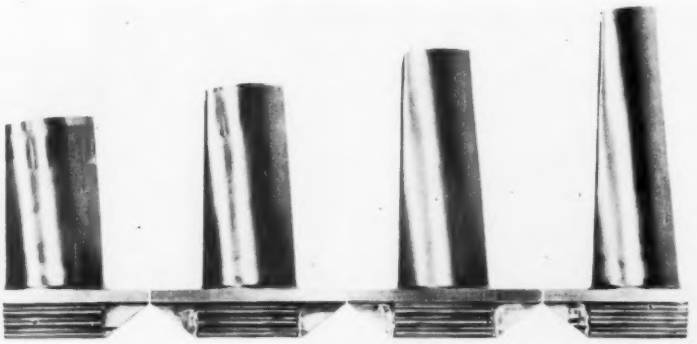


Skimmers and deflector along the turbine inlet (left) are intended to direct ash particles away from critical parts of the rotor blades.

The 1957 arrangement also has eliminated seals under the second, third and fourth stage stator blades (2S, 3S and 4S) for the same reason



Inner stage gland seal rings under the second, third and fourth stage stator blades were the same as those under the first and fifth stages.



Rotor blades now under test have blades with bases designed to fill space formerly occupied by seals. In each stage are two blade alloys. The General Motors alloy is a nickel-chromium-iron material, and the Haynes alloy is principally nickel, chromium and cobalt.

visory Committee for Aeronautics indicated that the Dunkirk problem was one in which NACA had done research. It was a problem of a secondary gas flow pattern being established within the turbine. NACA recommended that the inner stage seal rings be removed and that the space between the rotor blades be closed off. LDC staff members also installed skimmers along the curved surface of turbine inlet to draw off ash particles. Erosion tests by the LDC staff and independent agencies led to the selection of Haynes Stellite HS-31 and General Motors GMR-235 as blade alloys.

Difficulties encountered during the previous test program with ash separators were due to failure of instrumentation which sometimes did not indicate ash build-up. A manifold blow-down has greatly simplified what is now conceded to have been an "over-engineered" arrangement.

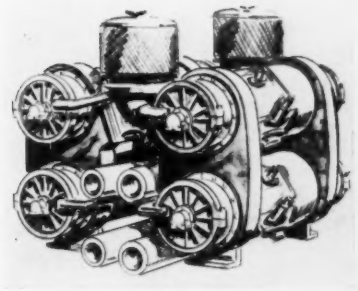
When the planned 1,000-hour commercial acceptability test with Pittsburgh and Pocahantas coals was concluded in mid-August, another series of tests were immediately undertaken before tearing down the turbine for a complete inspection. This new test series consisted of burning several cars of Wyoming lignite supplied by the Wyodak Resources Development Corp. of Gillette, Wyoming.

This fuel has a moisture content of 30 percent. It is a "¼-in. minus coal" and is typical of the fuels found in large quantities along the lines of the Burlington and Great Northern, according to P. R. Broadley, LDC director of research.

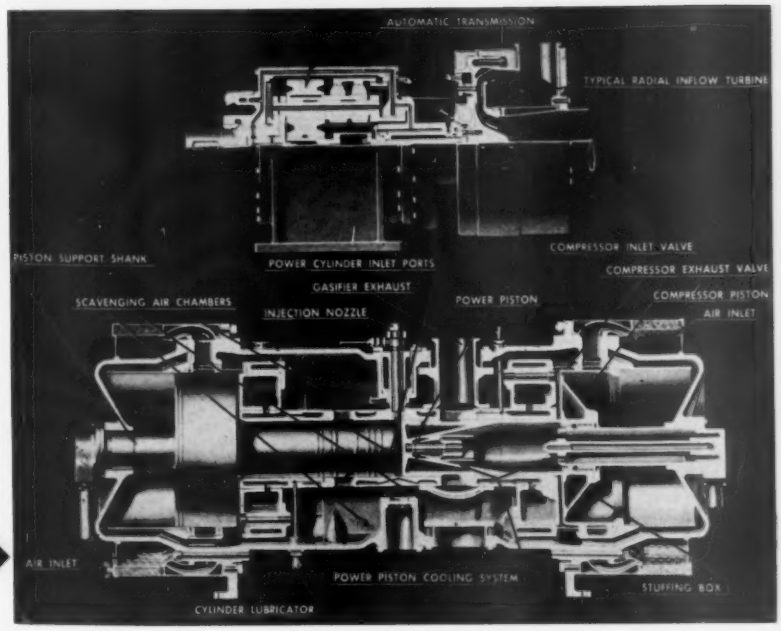
The lignite tests were run to determine the feasibility of generating electric power with this fuel in areas where the large volumes of water necessary for ordinary condensing steam-electric power stations are unavailable. A gas turbine operates without condensers.

The committee is now evaluating the results achieved during the 1,000 hour "commercial-acceptability" test. When the test results are in, information should be available indicating how the coal-fired gas turbine locomotive will be built and what the road test program will be. The current test program has given members of LDC much cause for optimism.

What Part Will These Play in Tomorrow's Motive Power?



Stack of four standard FP-165 gasifiers would be combined to give a 1,000-hp rating. This unit would be 4½-ft x 3½-ft x 5-ft.



Two-stage FP-165 gasifier cross section has above it a typical gas turbine and transmission for conversion from pneumatic to mechanical power. Pistons are free to bounce in their cylinders; have no linkage to any crankshaft.

B-L-H Building Two-Stage, Free-Piston Gasifiers

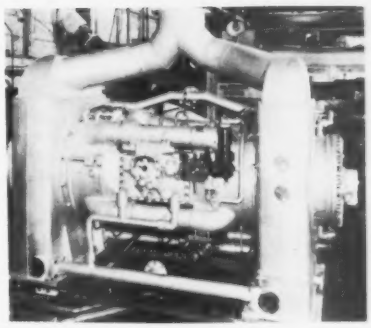
An advanced design of free piston engine has been announced by the Hamilton Division of Baldwin-Lima-Hamilton. Free piston engines produce pneumatic power, in contrast with the crankshaft engine which produces mechanical shaft power. The pistons are free to bounce in their cylinders. They are restricted by the cylinders, but not by any linkage through connecting rods to a crankshaft. Free piston engines deliver their pneumatic output to gas turbines for conversion to mechanical power. One of the most promising immediate uses for this engine is locomotive applications, according to B-L-H.

Power output of the prototype design ranges from 125 shaft hp—available from a single gasifier—up to 1,000 hp when gasifiers are used in multiples feeding to a common turbine inlet. The range is available through the use of two types of B-L-H free piston engines.

Both engines are products of a continuing program of research and development that led first to an efficient single-stage design—the Hamilton Model DL—then to the two-stage, turbocharged design—the Hamilton FP-165.

The DL uses a single stage of compression and a patented movable compressor head to produce an output of 500 hp. DL units can be combined in multiples with one turbine to reach a peak of several thousand shaft horsepower, when turbocharged. The new design FP-165 is a two-stage-compression unit which produces 250 hp with turbocharging; 125 shaft horsepower out. The free piston gas turbine plant can be made directly reversible and will provide reverse power up to 65 per cent of its forward power rating.

The model DL unit has been built and tested over the past two years. It can be produced in quantity for a wide range of applications. The FP-165 has been fully designed. Hamilton Division states that only production development and engineering are required to ready it for actual manufacture. Advanced performance of the Hamilton FP-165 hinges on its second stage of compression. All other free piston engines, and Hamilton's own previous



Tested at Hamilton, O., since 1955 have been two of these DL single-stage gasifiers. This predecessor to the two stage design is 9½-ft long, 5-ft high and 5-ft wide.

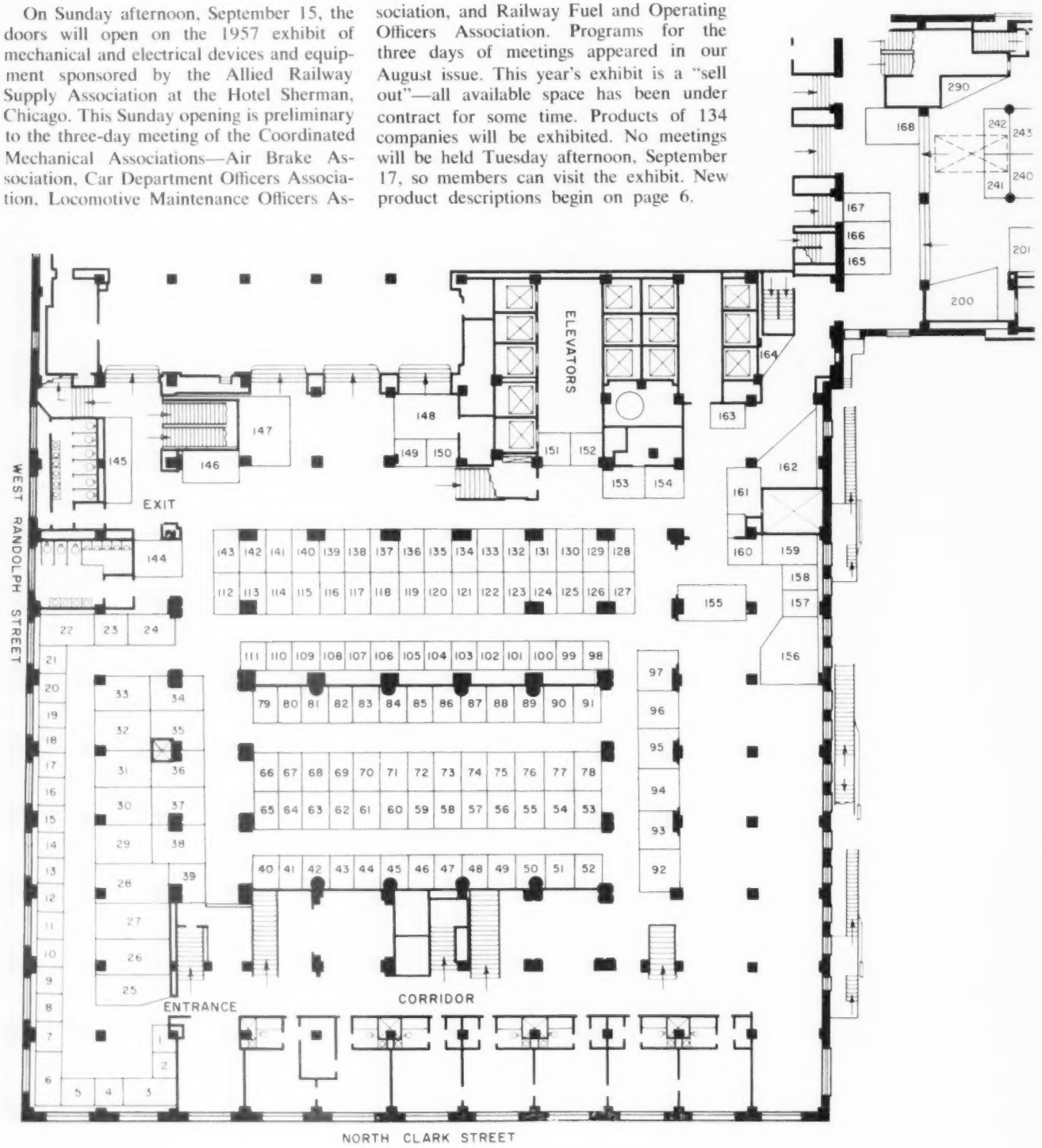
designs, have been single-stage-compression designs. The second stage, by using the energy from the outward piston stroke, affords a balance of energies, and permits a rise in output power without excessive stress and heat on the compressor discharge valves. Because of the inherent balance, the units are virtually vibrationless in operation.

The majority of applications to which the free piston engine could be applied immediately are now

(*Continued on page 52*)

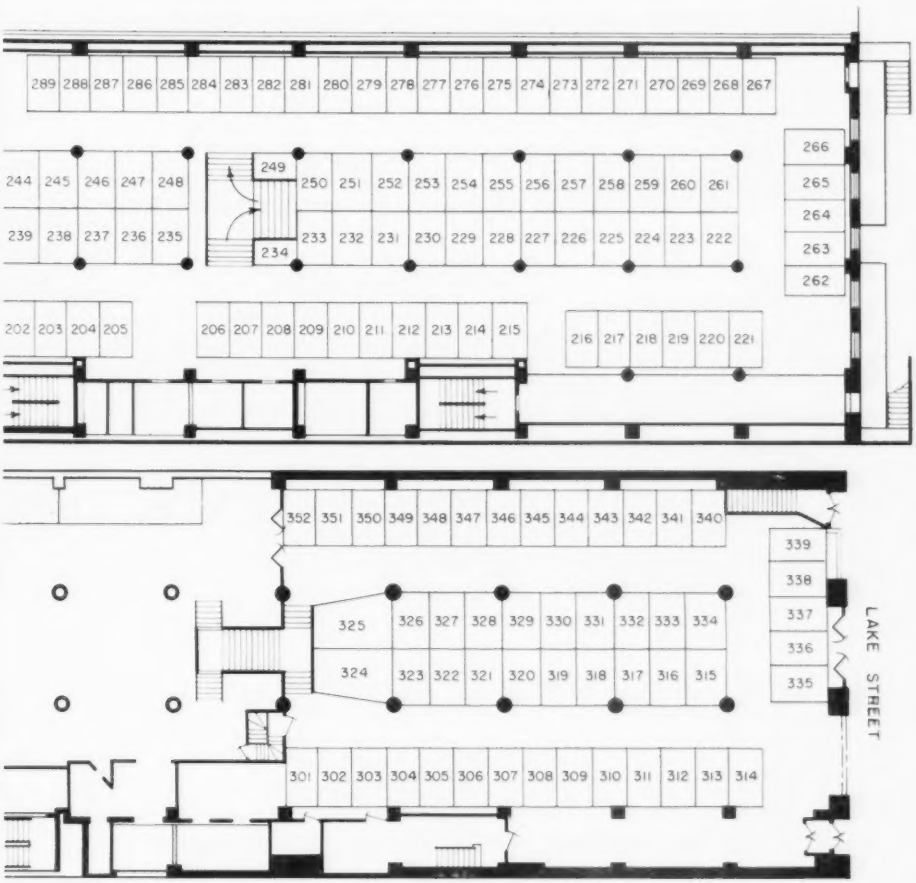
1957's Big Show . . . . . .

On Sunday afternoon, September 15, the doors will open on the 1957 exhibit of mechanical and electrical devices and equipment sponsored by the Allied Railway Supply Association at the Hotel Sherman, Chicago. This Sunday opening is preliminary to the three-day meeting of the Coordinated Mechanical Associations—Air Brake Association, Car Department Officers Association, Locomotive Maintenance Officers Association, and Railway Fuel and Operating Officers Association. Programs for the three days of meetings appeared in our August issue. This year's exhibit is a "sell out"—all available space has been under contract for some time. Products of 134 companies will be exhibited. No meetings will be held Tuesday afternoon, September 17, so members can visit the exhibit. New product descriptions begin on page 6.



Allied Railway Supply Association Exhibit

. . Mezzanine, Hotel Sherman, Chicago, September 15-18



LOWER EXHIBIT HALL

Exhibitors

Aeroquip Corp.	315 to 318
Air Maze Corp.	351-352
Ajax Consolidated Co.	206 to 208
Alco Products, Inc.	335 to 339
Allison Division, General Motors Corp.	147
American Brake Shoe Co.	209 to 211
American SAB Co.	89 to 91
American Steel Foundries	230 to 234 and 249 to 251-252-253
Arcair Co.	329-330
Archer-Daniels-Midland Co.	319-320
Axle Stop, Inc.	121
Band-It Co.	331-332
Barco Mfg. Co.	98 - 99 and 222 - 223 and 260-261
Beck & Blatchford Inc.	36-37
Bendix Aviation Corp.	160
Brandon Equipment Co.	288-289
Buckeye Steel Castings Co.	226 - 227 and 255-257
Budd Company	343 to 345
Buffalo Brake Beam Co.	240 to 243
Cardwell Westinghouse Co.	132-133
Caterpillar Tractor Co.	32 to 35
Chicago Malleable Castings Co.	150
Chicago Railway Equipment Co.	109-110
Chicago Pneumatic Tool Co.	228 - 229 and 254-255
Chromium Corporation of America	151-152
Clad-Rex Corp.	157
Cleveland Graphite Bronze Co.	29 and 38
Cleveland Hone & Mfg. Co.	65
Crerar-Adams & Co.	307-308
Current Controls Corp.	333-334
Daros American Corp.	340
Davis Brake Beam Co.	66-67
Dearborn Chemical Co.	216
DeVilbiss Co.	43-44
Double Seal Ring Co.	225 and 258
Dresser Mfg. Div., Dresser Industries	168
Duff-Norton Co	124 to 126
Dura-metallic Corp.	304
Electric Storage Battery Co.	95 to 97
Electro-Motive Div., General Motors Corp.	27-28
Encyclopedia Britannica	103
Enterprise Railway Equipment Co.	72
Epoxy Coil Corp.	101-102
Equipment Research Corp.	239 and 244
Fairbanks, Morse & Co.	200
Farr Company	60-61 and 70-71
Farrell Mfg. Co.	322 to 324
Fine Organics	342
Flannery Mfg. Co.	129
Frost Paint & Oil Corp.	149
Frost Railway Supply Co.	82
Garlock Packing Co.	15 to 17
General Electric Co.	6 to 9
General Steel Castings Corp.	153-154
Gould-National Batteries, Inc.	86 to 88
Gray Company	104 to 106
Griffin Wheel Co.	281 to 284
Gustin-Bacon Mfg. Co.	272 to 274
Hennessy Lubricator Co.	108
Holland Company	112 - 113 and 142-143
Hunt-Spiller Mfg. Corp.	224 and 259
Hyatt Bearings Div., General Motors Corp.	309 to 312
Ingersoll-Rand Co.	301 to 303
Journal Box Servicing	119-120
Joyce-Cridland Co.	212-213
Kaiser Aluminum & Chemical Sales, Inc.	313-314
Keystone Railway Equipment Co.	14
LFM Mfg. Co.	10 to 13
Linde Company	275 to 280
Lunkenheimer Co.	85
M & J Diesel Filter Corp.	89
MacLean-Fogg Lock Nut Co.	134 to 136
Magnaflux Corp.	327-328
Magnus Chemical Co.	346 to 348
Magnus Metal Corp.	79 to 81
Miller Felpax Corp.	146
W. H. Miner, Inc.	21 to 24
Morton Mfg. Co.	46 to 48
Motor Coils Mfg. Co.	56
National Aluminate Corp.	92 to 94
National Brake Company, Inc.	57 to 59
National Carbon Co.	275 to 280
National Forge & Ordnance Co.	325
National Malleable & Steel Castings Co.	161-162
Nelson Stud Welding Div, Gregory Industries	349-350
New York Air Brake Co.	285 to 287
Nife, Inc.	2-3
Nolan Company	73-74
Oakite Products, Inc.	18 to 20
Paxton-Mitchell Co.	49 to 52
Peerless Equipment Co.	107
Precision Engineering Co.	341
Press	1
Prime Mfg. Co.	39
Pullman-Standard Car Mfg. Co.	262 to 266
Punch-Lok Co.	45
Pyle-National Co.	267 to 271
Queen Stove Works, Inc.	100
Railway Equipment & Publication Co.	163
Railway Purchases & Stores	164
Railway Service & Supply Corp.	127
Reliance Steel Products Co.	62
Rolin Corporation	128
Rust-Oleum Corp.	321
Schundler, F. E. & Co.	326
Security Railway Products Co.	53-54
Shell Oil Company	75 to 78
Simmons-Boardman Publishing Corp.	144
SKF Industries, Inc.	165 to 167
Sonotone Corp.	83
Soerry Rail Service	156
Spring Packing Corp.	130-131
Standard Car Truck Co.	29 and 38
Superior Hand Brake Co.	84
Superior Car Door Co.	111
Timken Roller Bearing Co.	114 to 118 and 137 to 141
Transquip Corp.	305-306
Turco Products, Inc.	148
T-Z Railway Equipment Co.	30-31
Union Asbestos & Rubber Co.	25-26
Union Spring & Mfg. Co.	68
Uni-Pak Corp.	63-64
Unit Truck Corp.	290
Universal Railway Devices Co.	122-123
Van Der Horst Corp. of America	214-215
Vapor Heating Corp.	201 to 205
Watson Publications	145
Waugh Equipment Co.	155
Welles Equipment Co.	55
Western Railroad Supply Co.	4-5
Westinghouse Air Brake Co.	217 to 221
Wine Railway Appliances Co.	235 to 238 and 245 to 248
Wyandotte Chemicals Corp.	40 to 42
Yale & Towne Mfg. Co.	158-159

How the L&N Reclaims Lubricating Pads

. . . Preliminary Tests in 1956 Gave Satisfactory Results

Several hundred package lubricators of all types have been reclaimed by the Louisville & Nashville, including many damaged by eastern Kentucky floods in March 1957. Many contained from 2 lb to 7 lb of water.

The reclamation procedure was perfected in the Test Laboratory in Louisville, Ky., under the direction of J. W. Hebden, chemist and engineer of tests, in conjunction with the Journal Box Servicing Corporation, which has a contract with the railroad for the reclamation of conventional waste packing. The initial reclamation tests began in midsummer 1956. At that time, there were approximately 300 passenger cars equipped with Rolin lubricators which were about due for six-months' repacking. Economically, the lubricators could not be discarded. One hundred of these were removed from journal boxes at repack dates and renovated, using the JBS equipment.

PRELIMINARY TESTS OF RECLAIMED LUBRICATING PADS

Basis of Tests:

- Insoluble impurities obtained on loops on 20 per cent dry basis.
- Tension tests of rubber fillers made on 1-in. x 1-in. x 6-in. specimens, with exception of Miller where a 1-in. wide specimen was taken.
- Cloth specimens were 1 in. wide, and all figures are averages of three pads.

	BEFORE RECLAMATION	AFTER RECLAMATION
Uni-Pak		
Total impurities:		
Top loops, per cent	0.39	0.19
Bottom loops, per cent	0.70	0.23
Tensile strength:		
Rubber, psi	6.6	8.0
Cloth, psi	2068	2150
Oil, Ash, per cent	0.81	—
Insoluble impurities, per cent	0.40	—
Chenille Rolls		
Total impurities, per cent	0.70	0.37
Oil, Ash, per cent	2.96	—
Insoluble impurities, per cent	0.08	—
Rolin		
Total impurities:		
Top loops, per cent	1.24	0.29
Bottom loops, per cent	1.03	0.24
Oil, Ash, per cent	0.78	—
Insoluble impurities	0.15	—
Cel-O-Pak		
Total impurities, per cent	2.15	0.19
Oil, Ash, per cent	0.63	—
Insoluble impurities, per cent	0.38	—
Redipak		
Total impurities, top, per cent	3.21	0.93
Total impurities, bottom, per cent	3.10	0.70
Thickness, ends, in.	—	3 1/8
Thickness, sides, in.	—	3 7/8
Tensile strength:		
Rubber, psi	8	10
Cloth, psi	2000	2176
Oil, Ash, per cent	0.17	—
Insoluble impurities, per cent	0.11	—
Miller		
Total impurities, per cent	2.16	0.41
Height, in.	3 1/8	3 1/4
Tensile strength:		
Rubber, psi	2333	2499

JBS Does the Job

In this process, the pad was removed from the frame and in reassembling, usable parts from other assemblies were available to complete the package. Later, such parts were purchased. Tests of renovated pads indicated the renovated yarns had approximately 95 per cent of the wicking characteristics of yarns from new Rolin pads. As a consequence, renovated Rolin lubricators have been considered the same as new since that time.

A more extended investigation was made in October, 1956. For examples in this test, pads which had been applied at least twelve months, were removed from six captive wheel cars. These pads were renovated at the Louisville plant of the Journal Box Servicing Corporation, the only deviations from equipment used to renovate waste being:

- Pickers were arranged to avoid a tearing action.
- Rollers were set 2-in apart.
- Washing oil was maintained at a maximum temperature of 240 deg. F.

Determining insoluble impurities in the pads called for a new approach. The L&N was familiar with methods employed by other labora-

tories—washing the entire pad in a solvent, and separating loops. However in pads employing loops, any solid matter below the loops which could not possibly come in contact with the journal was not considered. The conclusion reached after a series of laboratory tests was that, when yarns acting as a filter absorb a certain amount of extraneous matter, their wicking abilities are either slowed or completely stopped. Consequently, for laboratory tests on the yarn type filter, insoluble impurities were obtained on loops on a 20 per cent dry basis, such procedure being followed on conventional waste. Cloth covered pads were tested by removing a section of the cloth and calculated on the same basis for comparison.

How the Pads Are Renovated

When lubricator pads are received for renovation, they are checked for wear and tear and gauged for thickness. If wear and tear has been sufficient to damage the pad so it may not function properly, it is discarded. If that part of a pad that is placed under the journal does not have a thickness of proper dimensions, it is likewise discarded.

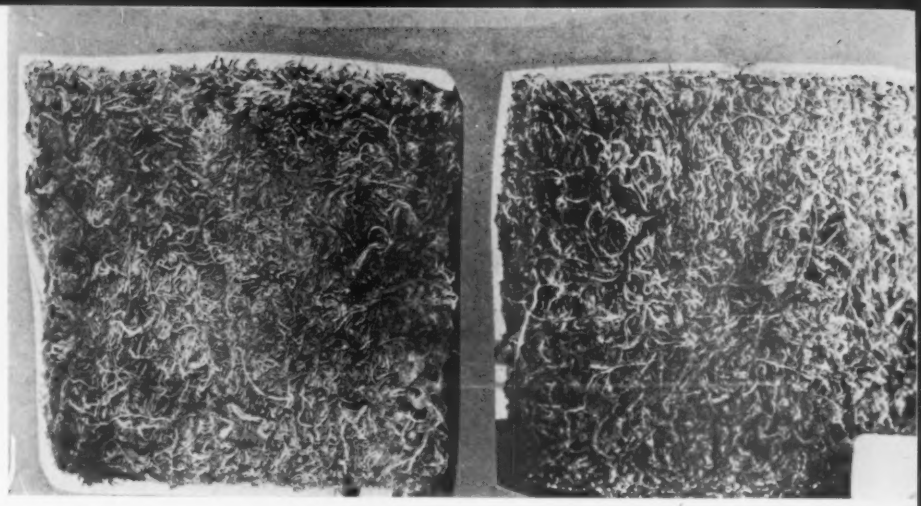
After the pads pass initial inspection, they are placed in a bath of hot oil (temperature limitations based on classes of lubricators) and mechanically carried through one washing machine unit, afterwards passing under a roller where excess oil is removed by pressure.

Pads Are Inspected

The process is then repeated, except the washing unit contains cleaner oil. The pads then go to a machine containing clean oil at about room temperature, where they are saturated and cooled. A final rolling operation removes the excess oil, leaving an oil-lubricator ratio of slightly better than 3.5 to 1 by weight.

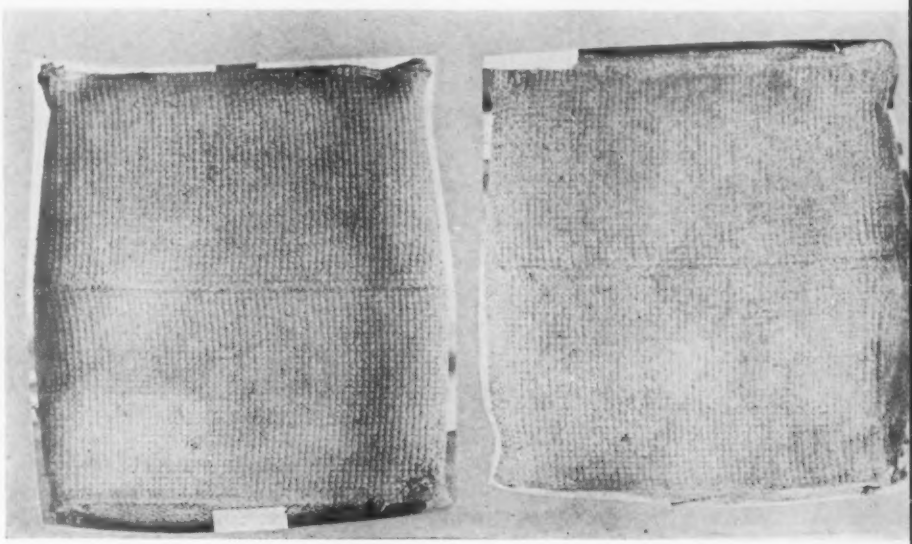
At this point, the pads are given final inspection and placed in barrels for shipment.

The L&N says the above procedures meet the requirements as set forth in the proposed AAR specification M-910A-57 covering the renovation of journal lubricating devices.



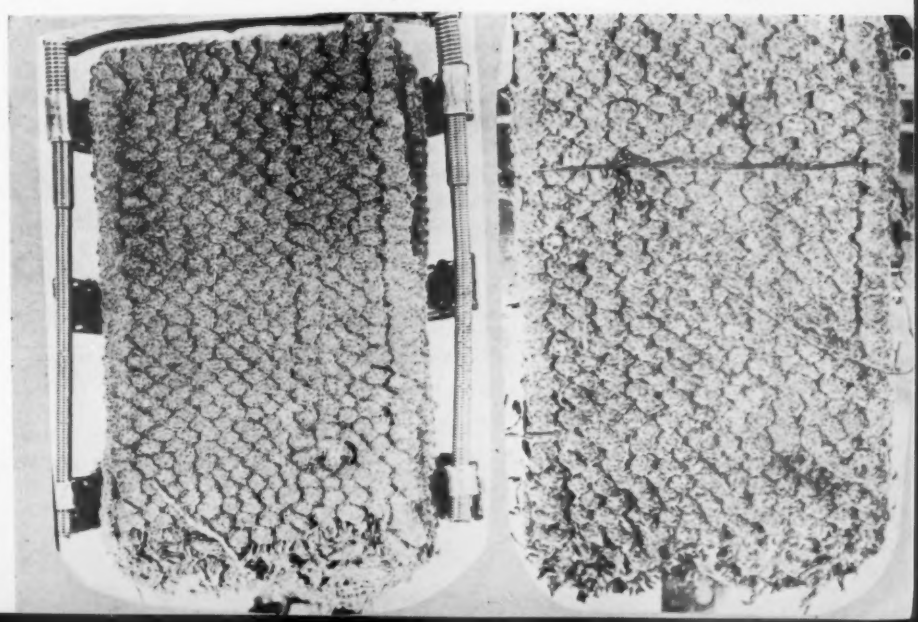
Before MILLER After

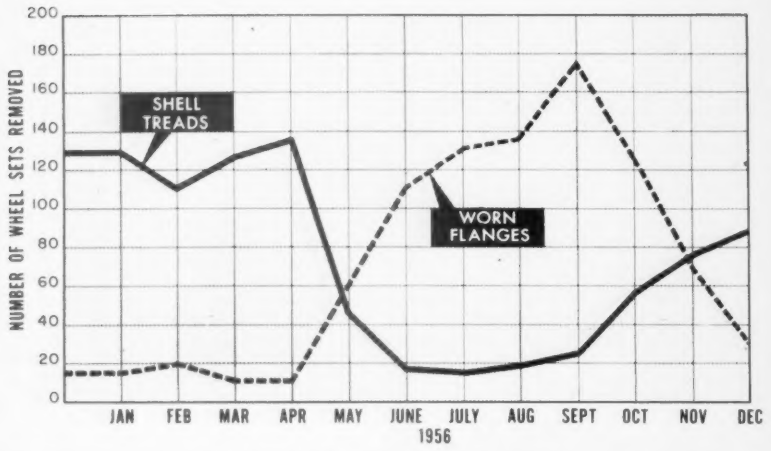
What Renovation Does After 12-Months' Service



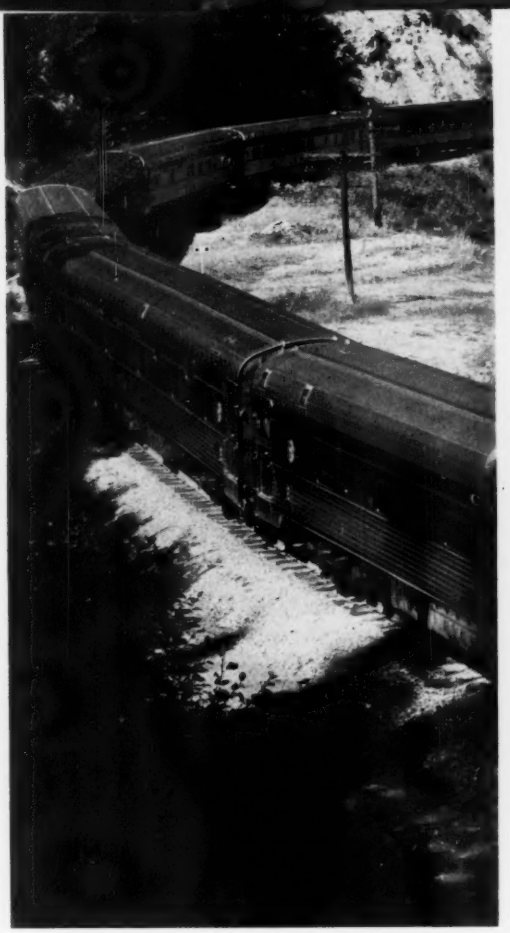
Before REDIPAK After

Before ROLIN After





Worn flanges are minor factor in wheel removal figures during winter months when heavy Canadian snow provides flange lubrication. During dry summer months this factor becomes the major reason for removal of wheels from stainless-steel fleet. Worn flanges and shelled treads account for about 90 per cent of removals year around.



With Records and Scheduling . . .

The Canadian Pacific Knows

Part II

Progressive preventive maintenance for 173 stainless-steel Canadian Pacific passenger cars used in transcontinental service requires records similar to those kept by many railroads for diesel locomotives. The program involves inspecting, testing, lubricating and replacing certain components of these Budd-built cars at 120,000-mile intervals. The complete program was detailed in our August, 1957, issue. The aims in setting up the program were to keep the cars on the road and to avoid taking them out of service for back shop work at regular time intervals. The success of the operation has not been due solely to preventive maintenance. In part, it has been due to the mechanical and electrical equipment and to the structural and decorative materials chosen for the cars when they were built.

The mileage intervals originally selected for work on the components were based on Canadian Pacific experience with the same or similar components on its conventional passenger cars. The records set up in Montreal have enabled the office of the chief of motive power and rolling stock to keep an accurate check on all failures and irregularities that occured with each component from the time it was new until it had reached the overhaul mileage originally established. From these records it has been possible to establish what would be the most realistic and economic service life.

Truck Maintenance

Some of these intervals have been increased progressively until the incidence of failures, or the condition of the component on removal, was such that the CPR felt it advisable to drop back to the previous mileage maintenance period to avoid difficulties. Along with the general program, the complete records have provided data which could aid in the solution of special problems such as those of wheel wear and lubrication.

Establishment of the proper interval for truck overhaul is an example of the way the mileage maintenance program has developed. There are 346 of General Steel Castings' four-wheel, outside-swing-hanger trucks under the 173 cars. In addition, the CPR has six spares —three in Toronto and three in Montreal. No attempt is made to equalize mileage on the cars, and the Toronto — Sudbury sleeper makes about 10,000 miles per month while the transcontinental cars average nearly 25,000 miles in the same period.

When ten of the trucks had accumulated 360,000 miles of operation, they were dismantled and inspected in cooperation with Budd

What Today's Equipment Will Do

engineers. Measurements were made of pin wear, bushing wear, and of other parts — all the conditions which would eventually dictate the necessity for rebuilding. These same ten trucks were again inspected when the cars reached 480,000 miles along with 56 other trucks which were dismantled, inspected, measured and then rebuilt. The ten trucks which were being used to determine progressive wear figures did not receive new pins and bushings, but were put back into service in their original condition each time to yield the additional data which the CPR wanted for making its final decision. Condition of the ten trucks

CANADIAN PACIFIC RAILWAY COMPANY

OFFICE OF CHIEF OF M.P. & R.S.

M.P. 617

JANUARY, 1955

MONTHLY WHEEL REMOVAL RECORD ON STAINLESS STEEL PASSENGER CARS

MONTH OF November 19 56 STATION Toronto Union FOREMAN A.E. Ind. General Car Foreman

CAR NAME OR NUMBER	DATE OF WHEEL CHANGE	PEDESTAL LOCATION	REMOVED WHEEL NUMBERS	REASON FOR REMOVAL	REMOVED ROLOKRON NO.	ROLOKRON SETTING WHEN REMOVED	INSTALLED WHEEL NUMBERS	ROLOKRON NO. INSTALLED
Alexandra	Nov. 16th	R&L-4	71951 - 71969	Rule PC7-74T	B-4040	.030	43532 - 43533	B-3974
Roger Manor	" 17th	R&L-4	3017 - 3096	" " 71S	B-3043	.030	211 - 217	B-4040
Chateau LeMoyne	" 17th	R&L-3	36783 - 48026	" " 71S	BB-4511	.030	72204 - 72226	B-3174
3010	" 18th	R&L-1	46051 - 47977	" " 71S	B-3272	.030	3080 - 3063	B-3043
Monck Manor	" 18th	R&L-4	9390 - 9302	" " 74V	B-3180	.030	72032 - 72041	B-3823
Monck Manor	" 18th	R&L-3	9316 - 9306	" " 74T	B-3948	.030	72028 - 71982	BB-4511

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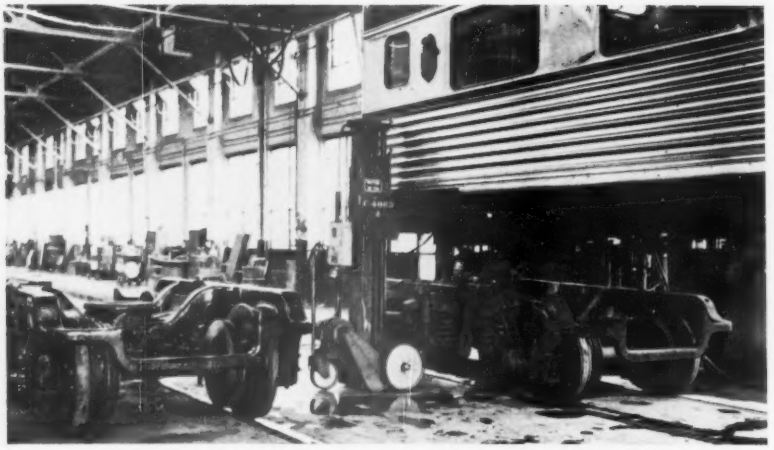
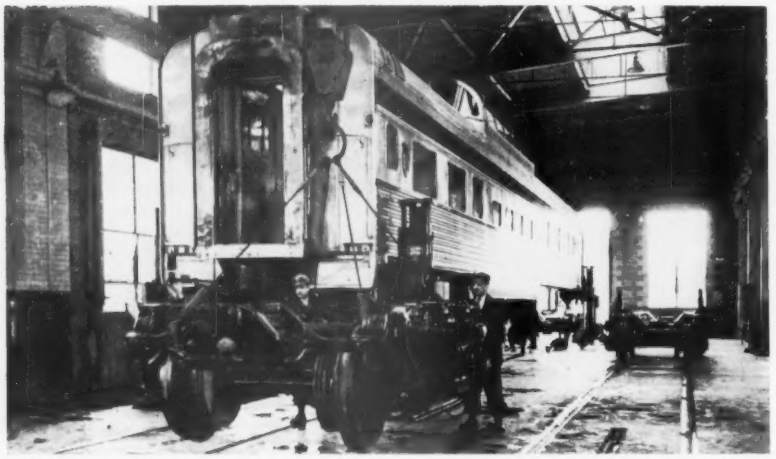
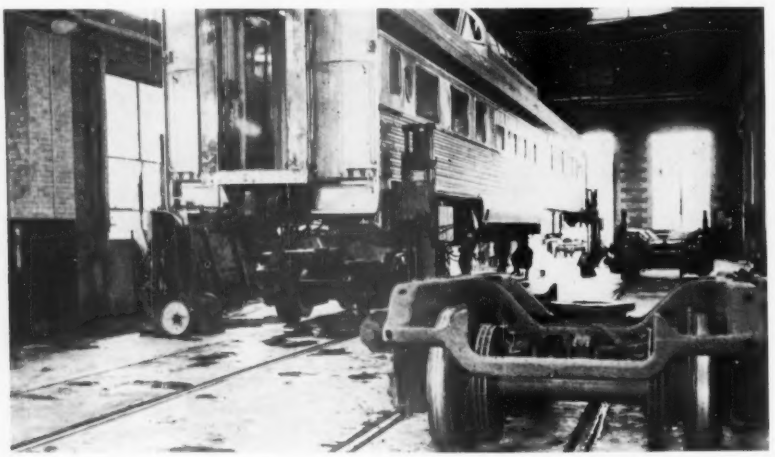
Why CPR knows what occurs with all of the components of its stainless-steel equipment is due to regular reports such as this one covering reasons for the removal of wheels at Toronto coach yard.



Trucks due for reconditioning are ready to be rolled out from under dome coach after the body has been raised on four Whiting 35-ton jacks.



Reconditioned GSC truck is hoisted into position to be put under car replacing one just removed. It is scheduled to run 600,000 miles.



Ready to lower, trucks are under dome car. CPR extended Montreal coach shop, installed 15-ton overhead crane, to service its streamliners.

after they had operated 600,000 miles determined the overhaul period for complete truck rebuilding.

Now when a car is posted for 600,000-mile work, trucks are readied for it when it is due in at its assigned terminal—either Toronto or Montreal. The partially rebuilt trucks are held in readiness at these points at all times. Once it is known which car is coming in for work, it is only necessary to apply the proper springs and brake cylinders to complete the trucks for the car. Cars vary in weight from 119,100 lb for the baggage-dormitory car to 145,400 lb for the dome-lounge car. The various types of cars require trucks with one of two sizes of disc brake cylinders, and with different combinations of the ten types of equalizer springs and eight sizes of bolster springs. These cars operate over hundreds of miles of line with sharp curves and heavy grades. Particular attention is paid to truck maintenance.

Wheel Life

Wheel maintenance is a separate matter. The CPR has a cumulative history of each of the wheel assemblies used under the stainless-steel cars. Each coach shop reports wheel changes made during each month, and the reasons. Angus shop scraps all wheels—not only those removed at Montreal but those that come out at other points. There are 692 wheel sets under the 173 cars, and an inventory of 100 spares is maintained. Montreal, Toronto and Vancouver all have drop pits for changing wheels.

However, cars dispatched from the two eastern terminals are supposed to have enough flange thickness to make the 5,800-mile round trip. This is done to avoid changing wheels at Vancouver since it is inconvenient to break the train up during cleaning and to switch cars to the Vancouver drop pit track. Cars have a minimum flange thickness of 1-in. when they leave Montreal or Toronto so that 1/16-in. of material will be available for the round trip.

The unusually complete records for these multiple-wear, wrought-steel wheels have produced much useful information. For example, accurate figures have been compiled showing comparative mileages being obtained from wheels on both disc-brake and clasp-brake equipped

WHEEL CHANGE-OUT RECORD FOR MONTH ENDING September 31st, 19 56

STAINLESS STEEL PASSENGER CARS

SERIES	No. of Steel Passenger Cars in month	NO. OF WHEEL CHANGE-OUTS FOR EACH SERIES OF CARS AND REASON FOR WHEEL REMOVAL. ALSO PERCENTAGE OF DEFECTS FOR EACH SERIES TO TOTAL OF 214 CHANGE-OUTS SHOWN FOR MONTH												AVERAGE MILEAGE OBTAINED PER WHEEL CHANGE-OUT FOR MONTH SHOWN	REMARKS
		Shell Tread		Worn Flange		Skid Flat		Worn Tread		Built-up-Tread		Other Defects			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Baggage - Dormitory 3000 - 3017	14			13	6			1	.5					70,630	
Dome Coaches Skyline - 500 - 517	26	1	.5	23	11	1	.5	1	.5					50,508	
DeLuxe Coaches 100 - 129	33	4	2	29	13									110,181	
Diners	19	4	2	14	6			1	.5					71,281	
Roomette Sleepers Manor Series	45	4	2	37	17	1	.5	2	1			1	.5	60,221	
Duplex Roomette Sleepers Chateau Series	42	4	2	36	17			2	1					46,722	
Dome Observation-Lounge Park Series	35	7	3	23	11	1	.5	4	2					43,126	
															Total Mileage wheels removed during month 13,474,167
TOTALS FOR MONTH	214	24	11.5	175	81	3	1.5	11	5.5			1	.5	AVERAGE MILEAGE PER WHEEL CHANGE OUT FOR MONTH	62,963

TOTAL NO. OF WHEEL CHANGE-OUTS TO DATE

ALL CARS IN ALL SERIES	Total No. of Change-outs	Shelled Tread		Worn Flange		Skid Flats		Worn Tread		Built-up-Tread		Other Defects		AVERAGE MILEAGE OBTAINED PER CHANGE-OUT	REMARKS
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
	3418	1635	47.9	1383	40.5	38	1	139	4	2	.1	221	6.5	62,877	

OFFICE OF CHIEF OF MOTIVE POWER AND ROLLING STOCK — AUGUST 1955.

Wheel study on stainless-steel passenger cars yields exact data on distribution of wheel defects, and permits comparison of various types and weights of cars. Report is compiled monthly.

trucks. In addition, mileage performances obtained from different classes of wheels and with those from various manufacturers are available when specifications for purchasing new wheels are made up.

Shop Loads

The entire preventive maintenance program for the 173 cars is divided between Toronto and Montreal. During the last quarter of last year, the preventive maintenance program involved each of these terminals handling from 6 to 14 cars per month. The shop loads and classification by the type of mileage maintenance performed are shown in the table below.

No attempt is made to concentrate this work in off seasons. The "Canadian" cars arrive at their maintenance terminals once each week and it may take two or more of these visits before all of the preventive maintenance items are completed. Cars are not held out of service for the work.

Centralized record keeping enables the CPR to keep close check on the rates at which materials are used in operating these 173 cars. Accurate predictions on the use of wheels are important because it is necessary to anticipate this consumption a year in advance.

The information from the Kardex records is also valuable in assisting in the preparation of the maintenance budgets. The 1956-1957 budget items covering maintenance of these 173 cars were, in part, based upon estimates of the man-hour and material requirements involved in the preventive maintenance program. The entire program anticipates that there should be little additional mechanical work necessary that has not been anticipated in advance. Knowing what will be done, and when, has been useful.

Already some cars are approaching their 720,000-mile inspections. All of the servicing and maintenance are aimed, not at obtaining exceptional component life, but at insuring reliable, trouble-free operation of the cars while providing comfortable trips for CPR passengers.

Month	Montreal	Toronto
October 1956 Total: 15 cars	5 Cars—480,000-mi. 4 Cars—600,000-mi.	1 Car —240,000-mi. 1 Car —360,000-mi. 4 Cars—480,000-mi.
November 1956 Total: 17 cars	3 Cars—360,000-mi. 4 Cars—480,000-mi. 3 Cars—600,000-mi.	4 Cars—360,000-mi. 3 Cars—480,000-mi.
December 1956 Total: 27 cars	6 Cars—360,000-mi. 5 Cars—480,000-mi. 2 Cars—600,000-mi.	2 Cars—240,000-mi. 7 Cars—360,000-mi. 4 Cars—480,000-mi. 1 Car —600,000-mi.

How's Hydracushion Doing?

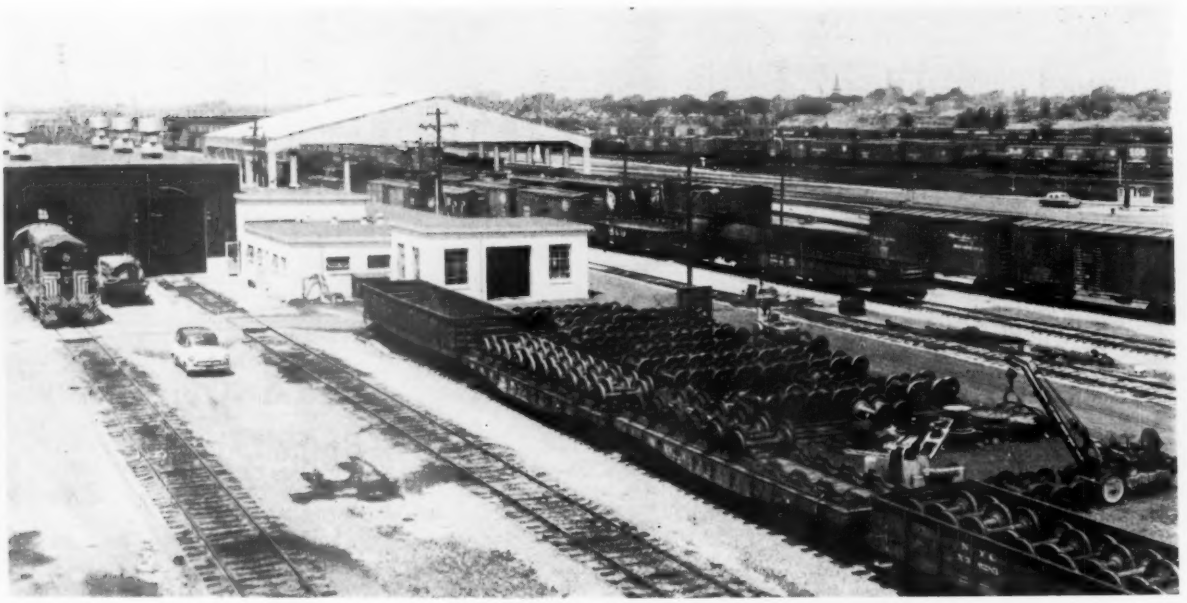
S. M. Houston, Southern Pacific, recently told of his railroad's experience with the hydracushion underframe (*RL&C*, May, 1957, p 53). It was pointed out this type of underframe design was chosen because it provides the travel necessary to achieve low car body accelerations at high impact speeds with a high capacity absorption device. Said Mr. Houston, "These requirements could not have been obtained if we had limited ourselves to the travel provided by a standard draft gear pocket."

Hydraulic buffers developed in the past were of the direct acting type which offered little improvement over existing gears and involved a major maintenance problem in fluid leakage. Hydracushion is not direct-acting, energy is not absorbed by transfer of hydraulic fluid, and fluid pressures do not exceed 800 psi. Cushioning capacity variable depending on the speed and severity of impact.

With two fully loaded 50-ton cars impacting at 10 mph, the hydracushion device develops approximately 250,000 ft lb capacity with sill loads of around 400,000 lb. Southern Pacific car 650803 with the hydracushion underframe has made 10 trips from Toledo, Ohio to the west coast automobile assembly plants, hauling curved windshields, and without the breaking of a single piece of glass.

To compare with regular cars, during March, 1956, the railroads handling this glass paid claims of $11,274 on these shipments, with SP's proportion being $4,498. During 1955, the GM plant in Los Angeles received 319 carloads of auto glass. From these, there were 246 claims, amount-

(*Continued on page 52*)



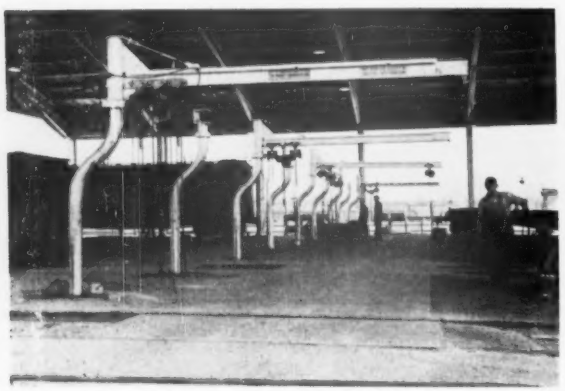
Car repair buildings are at west end of Frontier yard with locomotive repair and servicing facilities. Car wheels are handled from wheel tracks or from the small wheel shop with crane or lift trucks. Facility is pattern for future installations.

NYC's Most Modern Yard Gets . . .

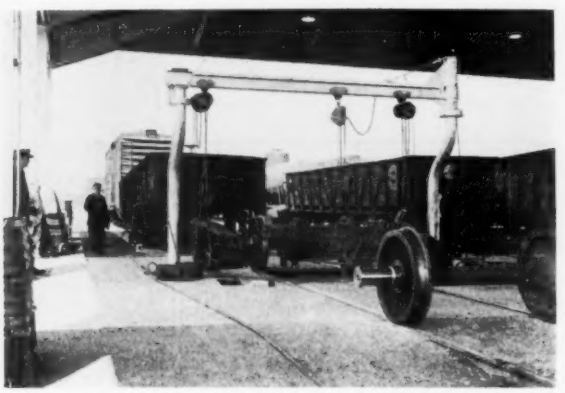
'Progressive' Car Repair Facilities

The 5,800-car Frontier Yard at Buffalo, N. Y., is the New York Central's most modern. From last February—when it went into operation—until the end of June, it had a conventional type 5-track light freight car repair facility. A long, one-story concrete block structure at the south side of these five tracks contains the stores facilities, wood mill, a blacksmith shop, an oil room, air room, a wheel shop, locker rooms and offices. The wheel shop has only a journal lathe; other wheel work is done at the NYC's central wheel shops.

Even before the big yard was complete, plans were stated to put in the "progressive" or "spot" scheme for light car repairs. It was almost July before the open-sided car repair shed and all of the necessary equipment could be installed. Then within only a few weeks, Buffalo yard's light repairs went from a one shift to a two shifts, and finally, to round-the-clock operation. Car delays are reduced, car availability is increased, and customers get shipments sooner.



A-frames at each of five tracks are pedestal cranes which swing into stanchions for use. Shop has mercury-vapor lighting.



One electric and two chain hoists are on A-frame. Retainer over bolster holds brake beams; only one side frame need be removed.

Buffalo yard has been classifying about 3,000 cars daily, and from these come 40 to 50 cars which are bad ordered or are due for periodic lubrication or air brake work. These cars are found by inspectors working along the hump, and are classified into an assigned track in the yard.

All Repairs Speeded

At frequent intervals they are moved to the inbound tracks at the repair facility. Even with this speedy handling, not all work is done on repair tracks. NYC has a station wagon to get car repairmen, necessary tools and material to disabled cars in the yard. Work of this type includes adjusting and rebanding some loads, straightening some safety appliances, and repairs to broken train lines.

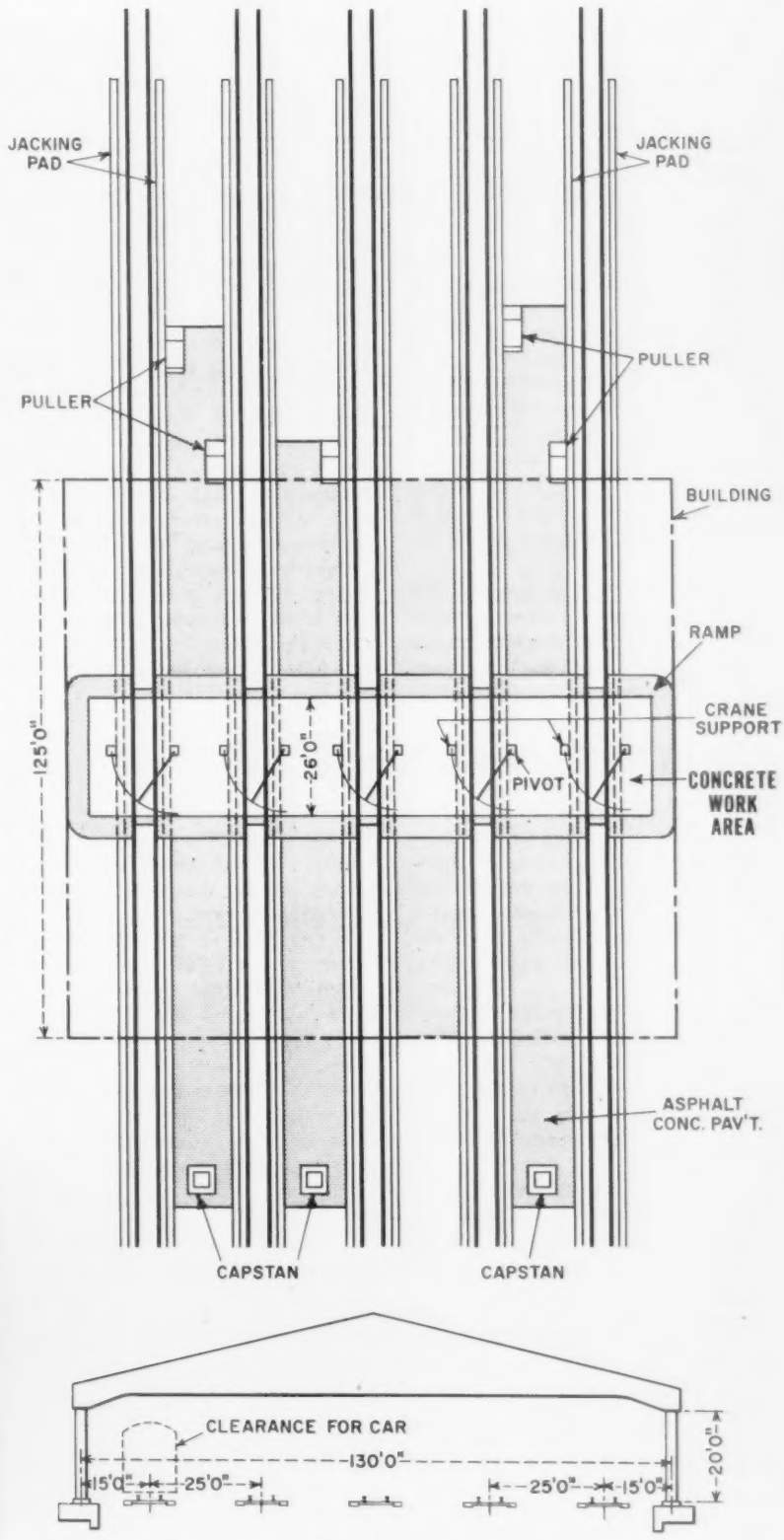
Only classification on the inbound tracks at the car repair area is to place the heavy repair cars on Track 5. All other cars are worked as delivered, irrespective of defects. Principal work handled on the other four tracks is mainly journal repacking, brake cleaning and wheel changes.

The crews are usually two men assigned to each track with air brake men, welders, oilers and laborers working at various locations in the shop as required.

Cars are pulled in from inbound tracks with winch-type car pullers and moved on the outbound side with ropes over capstans. This new installation is to be duplicated at Youngstown, O., and Elkhart, Ind., in new yards now under construction.

Car puller with steel cable moves several coupled cars into repair shed.

This Is Repair Area for 5,800 Car Yard



Corrugated metal structure covers five tracks. Air, 110-V and 220-V a-c are installed now. NYC later plans to pipe in oxygen and acetylene. Work and locker rooms (not shown) are at left.

How's Hydracushion Doing?

(*Continued from page 49*)

ing to $104,311—an average claim per car of $326.99. Of the 349 Hydracushion cars now being built, 54 will go into glass service and the remainder will be in general service. The SP is negotiating rights for the building and selling of hydracushion underframes under its license.

Hydracushion performance was reported by SP's general superintendent motive power to the recent AAR Mechanical Division meeting during a discussion of the report of the Committee on Couplers and Draft Gears. A report was made by a Sante Fe representative on his road's experience with long travel draft gears indicating that they have also been successful in reducing forces developed during impacts.

The Committee has requested the Mechanical Research department to secure authority to conduct impact tests on various draft gears and cushion underframes to evaluate their performance in protecting lading. This is to enable the railroads to evaluate the types of gears which give maximum protection to lading and to determine the overall cost. These are to resolve different results reported by draft gear manufacturers. The Committee states "it would seem logical to assume that present day train speeds, train lengths, and switching speeds . . . . have about reached the maximum that is permissible." New equipment is now being calibrated for the official draft gear capacity tests.

The Committee is taking steps to require that all reconditioned draft gears successfully pass the AAR tests before application to any car. Previously, Interchange Rule 3 specified that "untested" gears could not be applied to foreign cars. Said the Committee, "There should be no difference between system and foreign cars in the minimum protection required for lading . . . . more care will have to be exercised in the use of second hand gears."

Wear in draft gear attachments during the first two years of service had led the Committee to recommend that the specification for rubber gears require not less than 4,500 ft lb capacity at 1 3/16-in. travel. The wear in the draft gear key, yoke and associated parts may be due to the initial travel of some present rubber gears being "too soft". During the year, the Committee has placed three gears on the list of "non-approved" types and their manufacture has been discontinued. During the past year, the Cardwell Westinghouse Mark 40 and the Peerless Type T-1 received conditional approval and 6,000 gears of each authorized for application.

Suggestion that spring-type coupler carriers under E couplers be prohibited in interchange was considered by the Committee, and it was decided that their was no justification for this action. The Committee is recommending that couplers for "other than steam" locomotives be reduced to four basic types.

BLH Building Free-Piston Gasifiers

(*Continued from page 41*)

diesel-powered. According to Baldwin, the free piston engine surpasses the diesel in these respects:

- Has a much greater power-to-weight ratio—more power in a smaller size.
- Burns a wider range of fuels. A diesel can burn efficiently only diesel and residual oils.
- Can be combined so that multiple gasifiers supply one turbine to provide a wide range of power outputs.
- Provides high-starting torque, controlled variable speed and reversibility without using the more bulky and costly transmissions and torque converters.
- Service and maintenance costs are expected to be far less than that for diesels.

The Hamilton FP-165 engine surpasses the open-cycle gas turbine, long held to be the most desirable substitute for the diesel in most applications, in these respects:

- Consumes half as much fuel at full load; uses substantially less than half as much at low loads and at idling speed.
- Decelerates much faster. Requires no high-speed high-inertia compressor on the shaft that supplies output power.
- Operates at temperatures of approximately 1,000 deg where ordinary steels can be used. The open-cycle gas turbine operates in the 1,500-deg range, where special steels must be used.
- Provides immediate high-torque characteristics. The gas turbine rotor must be operating at high enough speed to operate its integral compressor before it can supply high torque.
- Gasifiers can be stacked or combined to supply one turbine and afford a wide range of horsepower output.

BLH Plans Production

From the results obtained with free piston engines, Hamilton Division of B-L-H believes that use of free piston machinery soon will be widespread. The firm also states that large expenditures on further research and development for facilities to produce large quantities of the machines are warranted. In addition to its free-piston engine development, BLH is now engineering an all-service type of diesel-hydraulic locomotive. This unit, according to McClure Smith, BLH president, would be a larger version of the Mec-Hydro locomotive now operating on the New York Central (*RL&C, June 1956, p. 58*). He went on to predict that the study of compact atomic power plants would be concluded late this year. This will examine the feasibility of units which could be used for mobile power plants and locomotives.

The study of atomic energy for railroad applications has been carried on cooperatively with the Denver & Rio Grande Western under a contract with the U. S. Atomic Energy Commission.

In addition to Baldwin, it is known that General Motors is working on a 2,000-hp free-piston, gas-turbine-electric locomotive. In Europe there is a 1,000-hp unit with mechanical drive operating on the French State Railways. Two larger units also have been designed for European service.

HOW TO

Learn About Air Brakes

. . . AND HAVE FUN DOING IT

24-RL Automatic Brake Valves — *Installment 1F*

D-24 MC Pressure Maintaining Brake Valve

This is the sixth installment on the 24-RL Equipment in the Air Brake in Color Schematics series. For the 1E installment see Page 57 of the May, 1957, issue.

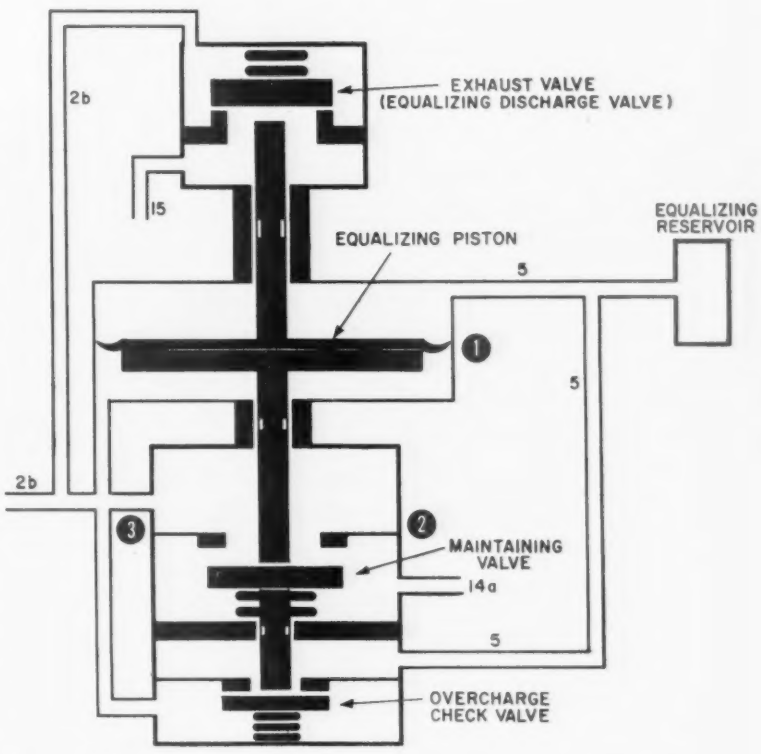
Operation at Equalizing Portion During Pressure Maintaining (Sketch 15)

If the pressure differential across the diaphragm increases due to brake pipe leakage, the diaphragm assembly is moved downward until the maintaining valve plunger unseats the maintaining valve. Feed valve air flows to brake pipe passage *2b* by way of passage *14a*, the strainer, the maintaining supply choke, and the open maintaining valve. The maintaining valve thus meters feed valve supply air as long as there is brake pipe leakage. The maintaining supply choke, located above the strainer, controls the amount of leakage that the feed valve is permitted to maintain.

To color sketch 15, proceed as follows: With a yellow pencil fill in the space above the exhaust valve, and fill in passage *2b*, the space above the maintaining valve seat and the chamber beneath the equalizing piston. Continue down the passage and fill in the chamber below the overcharge check valve. Fill in the space below the exhaust valve and passage *15* in yellow dashes. Dampen and allow to dry before proceeding on the next coloring operation.

With an orange pencil, color passage *14a* and the space below and above the maintaining valve, joining with the yellow color above the maintaining valve seat. Dampen and allow to dry.

With a light green pencil, color the space above equalizing piston (chamber D), passage *5*, equalizing reservoir, and the space above the overcharge check valve. Dampen and allow to dry.



Sketch 15

Operation at Equalizing Portion During Pressure Maintaining

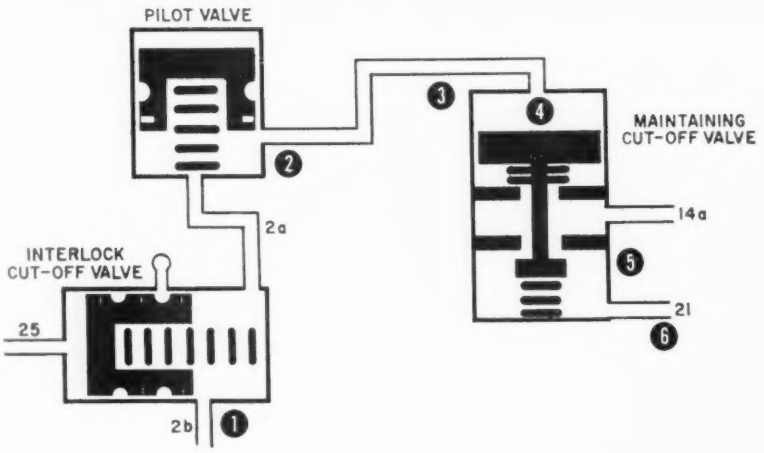
1. Due to broke pipe leakage, higher equalizing reservoir pressure forces equalizing piston downward.
2. Piston stem unseats maintaining valve.
3. Maintaining air flows from passage 14a past the open maintaining valve to brake-pipe passage and to brake pipe.

Maintaining Cut-off Assembly In Operation (Sketch 16)

On the D-24 MC type brake valve, the maintaining cut-off valve is located on the filling piece portion. This valve provides manual and automatic control of the pressure maintaining feature. When its handle is turned to *IN* position, brake pipe air is allowed to flow through the open pilot valve to the face of the maintaining valve piston. The downward movement of the piston unseats the check valve and connects feed valve passage *21* to maintaining passage *14a*.

To color this sketch, proceed as follows: With a yellow pencil fill in passage *2b*, the spring chamber at the right of the interlock cut-off valve, passage *2a*, the space beneath the pilot valve, the passage leading to the maintaining cut-off valve and the space above the piston. Dampen and allow to dry.

With an orange pencil, color passage *21*, the chambers below and above the check valve and passage *14a*. With a carmine pencil color in dashes, passage *25* and the space at the left of the interlock cut-off valve. Dampen and allow to dry.



Sketch 16

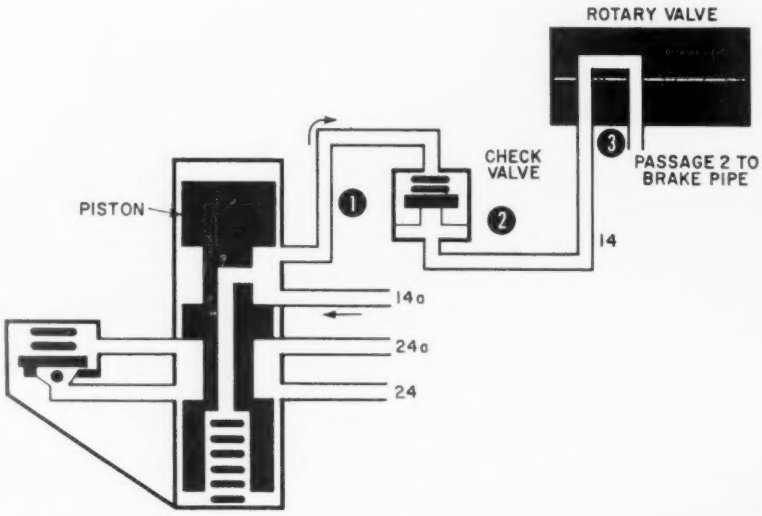
Maintaining Cut-Off Assembly in Operation.

1. Brake-pipe pressure enters Interlock Cut-Off Valve.
2. Brake-pipe air passes through the Cut-Off Valve and enters Pilot Valve.
3. Pilot Valve Piston moves upward and brake-pipe air flows past pilot valve to chamber above Maintaining Cut-Off Valve Piston.
4. Piston moves down.
5. Piston stem opens Maintaining Cut-Off Valve Check Valve.
6. Feed-valve air from passage 21 flows past open check valve to passage 14a.

First Service Cock Assembly During Pressure Maintaining (Sketch 17)

To color this sketch, proceed as follows: With a yellow pencil, color passage *2* through the rotary valve, and passage *14* to the underside of the check valve. Dampen and allow to dry. With an orange pencil, start above the check valve filling in the passage and the cavity around the piston, down through the center of the piston including the spring chamber. Fill in passage *14a* leading out of the piston cavity.

With a dark green pencil, color in dashes passages *24* and *24a*, the cavity around the piston, and the passages to and including the space above and below the left hand check valve and ball. Dampen and allow to dry.



Sketch 17

First Service Cock Assembly During Pressure Maintaining. Brake Valve in LAP Position Following a Service Reduction.

1. Maintaining pressure flows from passage 14a through First Service Piston to chamber over check valve.
2. Check valve closes and prevents flow to passage 14 and 2.
3. Passage 14 is connected through rotary valve to brake pipe via passage 2.

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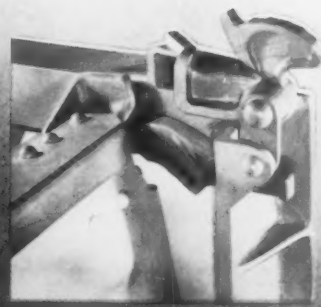

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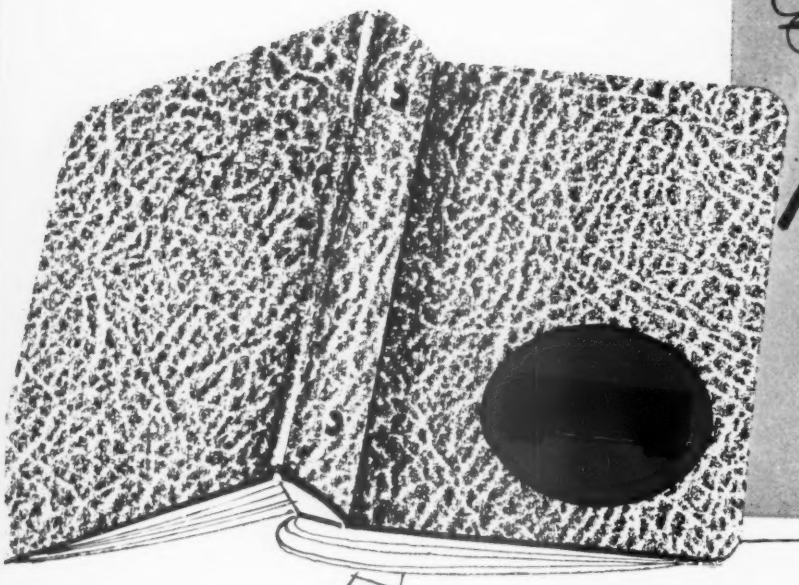

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1. unit load cars
   UNDERFRAMES, BULKHEADS, DOORS
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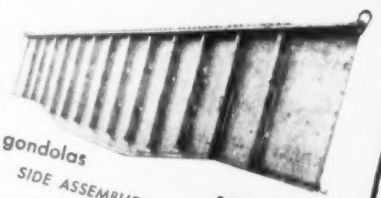
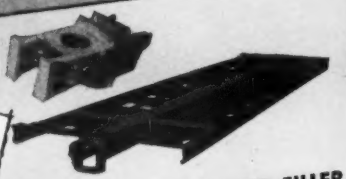


gondolas
SIDE ASSEMBLIES



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PRECISION FABRICATORS OF CORRECTIVELY DESIGNED COMPONENTS

4 Roll Them Out Like New

Cleaning Electric Machinery

It's A Broad Field

STRANGE AS IT MAY SEEM there is no one best way to clean electric machinery. But, as in so many other maintenance practices, the search goes on. More is being learned about the subject, and methods and equipment are being perfected every day. What is good in one case may not suit at all in another. There are good reasons for the many cleaning methods and materials now available, because cleaning methods and materials change with conditions. For instance, a large continuous volume of work may justify an elaborate, expensive cleaning installation, while a bucket and hand brush will do nicely for just a few parts.

The steady demand for increased power and performance causes changes in design and construction of machinery. As an example, rollers replaced sleeve motor bearings, gaining space for additional active material. Working this material harder raised the operating temperature of the machines. All this created new maintenance problems. Especially important to cleaning, are changes in electrical insulation. As operating temperatures increased the Class A organic materials, such as paper, cotton and shellac gave way to the Class B inorganic materials, such as asbestos and mica. Today the higher temperature Class H synthetic materials, such as silicones and Teflon are available. Each new material brings new strength to the job. But it also has weaknesses which must be learned and overcome.

New developments in cleaning are keeping pace with this evolution of materials. The bucket and hand brush give way to solvent sprays, the steam jet and detergents. More recently, the vapor degreaser and various abrasive blast systems have been added to the list. Now ultrasonic vibration cleaning methods are coming into use. All these, together with the ever-increasing line of chemical and mechanical cleaning materials, make a wide and bewildering field from which to choose. You can select whatever best suits your need. Each has its good points and weak points. No wonder there are strong differences of opinion. This is to be expected where facts and experience are being accumulated and are not always readily obtainable. Time and study are needed to make the proper choice. Some shops have several cleaning methods and use each on the jobs where it gives the best results.

One way to study this variety of cleaning methods is to start at the beginning and examine the fundamentals a step at a time. This will help make clear why certain methods are used. When the *why* is understood, the *how* to do a given job will be easier to judge and select.

First Clean the Outside

When a piece of equipment is removed from service the outside is likely to be the dirtiest part. This is particularly true of traction motors that operate under the locomotive only a few inches above the roadbed. Whenever possible, most of this dirt should be removed before the equipment enters the repair area of the shop. Where the climate permits, this job is often done outdoors. If it must be done inside, use a separate cleaning room arranged so that the dirt removed from the equipment will not spread to the rest of the shop. Fortunately, this dirt is easy to reach and remove because it is on the outside of the equipment. Also, a clean exterior makes it easy to disassemble the equipment by exposing the bolts and locking devices. Furthermore, it helps keep the repair shop clean and reduces the danger of contaminating good equipment with dirt brought in from the field. This will also keep the bulk of the dirt out of the specialized shop cleaning equipment and solvents.

This outside dirt may be removed by any one of several methods. Steam jets with detergents, Fig. 1, are often used for this job. Railroads have used this cleaning method for years. Another way of removing this dirt is to use solvents and scrapers. Dry abrasive methods have also been tried. These scrub the dirt off without using water or solvents.

A good precaution during cleaning is to keep the inspection covers on, and to close off all air inlets into the equipment. This will keep the loosened dirt and the caustic or solvent cleaner out of the machine. If these get in they can damage brushes and exposed insulation. Here's how it happens. The outside of the motor dries off rather quickly in the air. The inside stays wet longer, especially if it is closed up for a trip to the shop. Under such conditions brushes, springs and commutators remain mucky and chemicals act upon and penetrate insulation.

In this way, healthy motors have been damaged after removal by well intended but careless exterior cleaning. All this presents special problems for the shop to correct. Such contamination may also destroy evidence and interfere with finding the cause of defects. For these reasons care should be exercised when cleaning work is attempted at running maintenance points. If it's going to be done there it should be entrusted to a trained, reliable man who has been instructed in the proper precautions.

(*Turn to page 58*)

This is the fourth article in a new series covering heavy maintenance of locomotive electrical equipment. It is written by J. W. Teker, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

Fig. 7—For small jobs, cleaning solution can be applied with a bucket and brush.

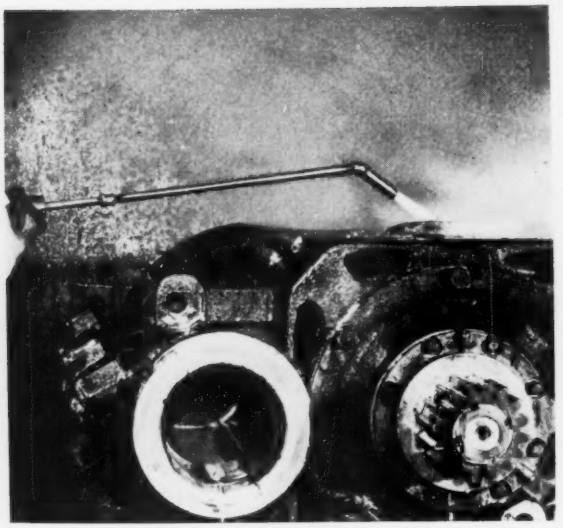


Fig. 1—Outside dirt should be removed before equipment is disassembled.

After the exterior has been cleaned, equipment is brought into the shop. The outside dirt has now been removed so you can read the nameplate and get information for record purposes. Routine measurements and inspections can be made without struggling with dirt.

When the machine is dismantled we have a variety of parts. They can be divided into two classes: parts that are wholly metal and parts that are a combination of metal and electrical insulation.

Metal parts, such as pinions, gears, gear cases and frameheads are sometimes all put through the same cleaning process. If caustic and hot water or powerful solvents are used, remember that every trace of oil film may be removed from the highly finished machined surfaces. If these are left exposed to the air without proper protection they will begin to rust right before your eyes. For this reason precision finished parts having highly polished surfaces like roller bearings are often separated from the others and given different treatment. They can best be cleaned in a separate room, handled individually, and immediately dipped in light oil after cleaning. Then they can be inspected and defective ones rejected. Those that pass inspection can be suitably protected and stored for future use.

Remember that carbon brushes may be seriously altered when put through some cleaners. Although they appear the same they will not perform the same. The cleaning can remove certain necessary ingredients of the brush composition. Also, brushes are like sponges and will soak up cleaner if they are dipped in it. After such treatment they are never the same, even though the trade mark is still stamped on them. The contamination can be enough to change both their mechanical and electrical performance. So, when cleaning brushes, scrape the muck off and wipe the brush with a cloth dampened with evaporating solvent. Do not soak or dip the brush in cleaner. Many brushes

(*Continued on page 62*)

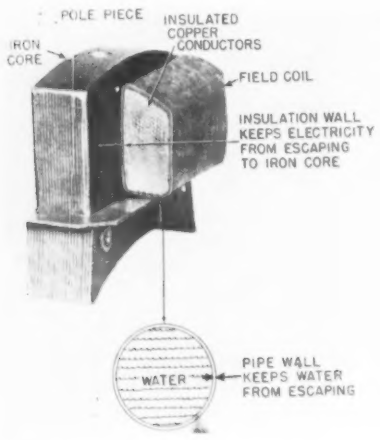


Fig. 2—Insulation is like the wall of a pipe.

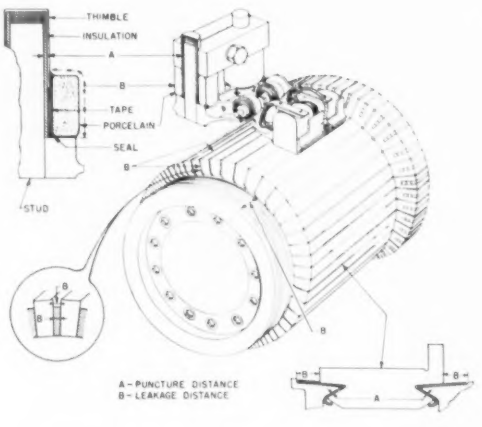


Fig. 3—Location of creepage surfaces on commutator and brush holders.

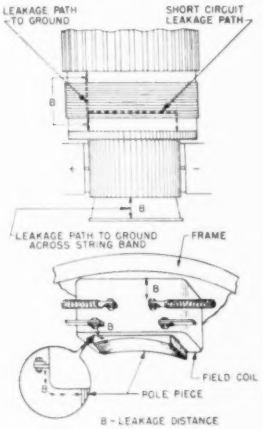
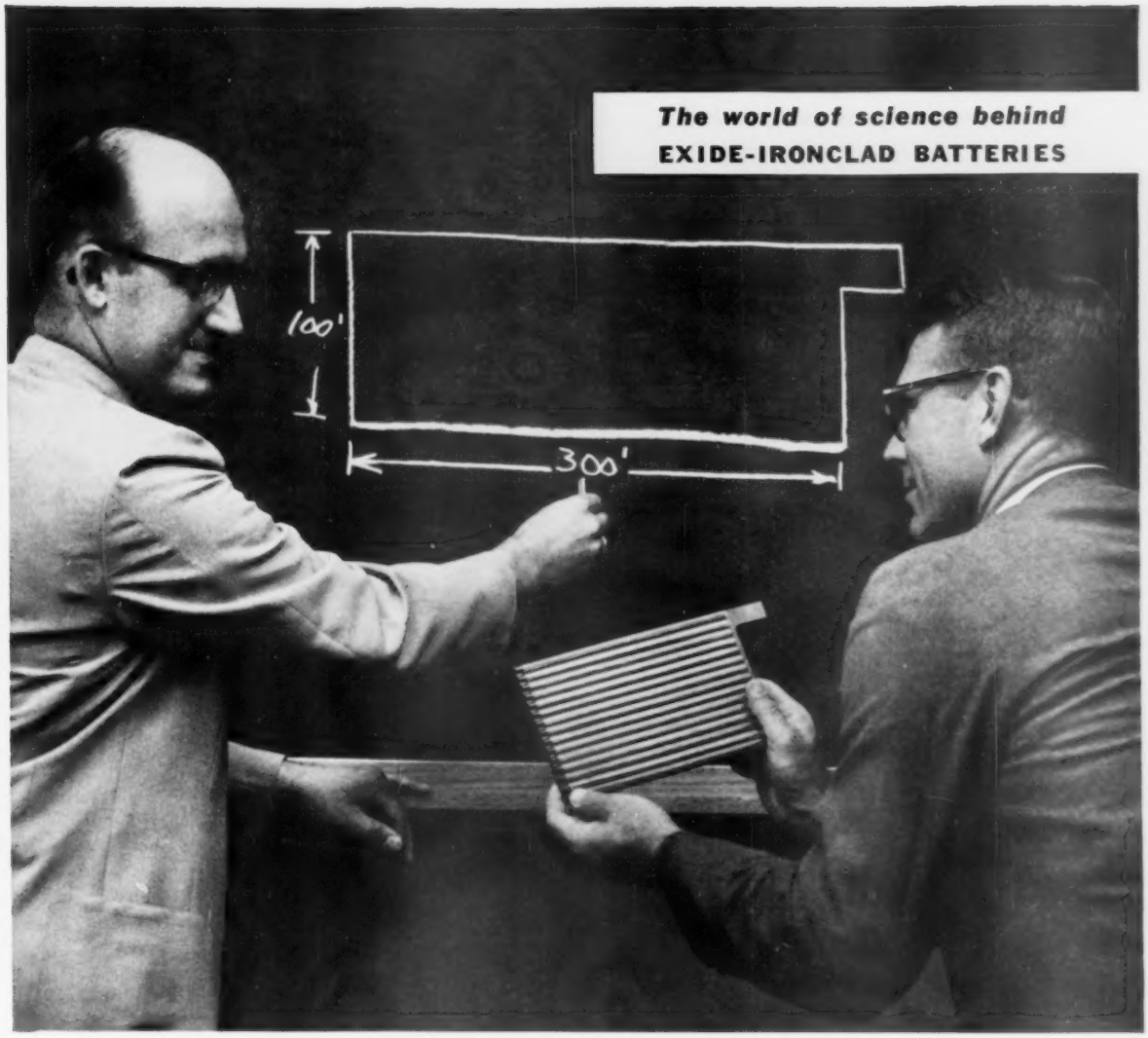


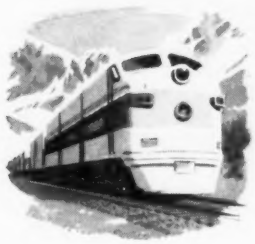
Fig. 4—Creepage surfaces on armatures and field coils.



Being interviewed is G. S. Hartman, Administrative Assistant to the Director of Research.

"The active area is 48,000 times as big as the plate"

At the Exide Laboratories—**Reporter:** Are you talking about just that one Exide-Ironclad positive plate, Mr. Hartman?



Hartman: That's right. The surface area of the active material in this plate is 48,000 times as big as the plate size.

Reporter: How is that possible?

Hartman: Because Exide can take full advantage of the superior retention characteristics of the tubular plate design by using specially prepared active material. This material means more surface area.

Reporter: What does this enormous active area mean to the battery user?

Hartman: More power. An Exide-Ironclad Battery can carry heavier work loads, intermittent and continuous, because it has the extra contact area between the active material and the electrolyte where the extra power can be developed.

Reporter: Obviously, this is an important feature of the Exide-Ironclad.

Hartman: Yes it is. But it's just one of many engineering details that contribute to its high capacity and long life.

Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

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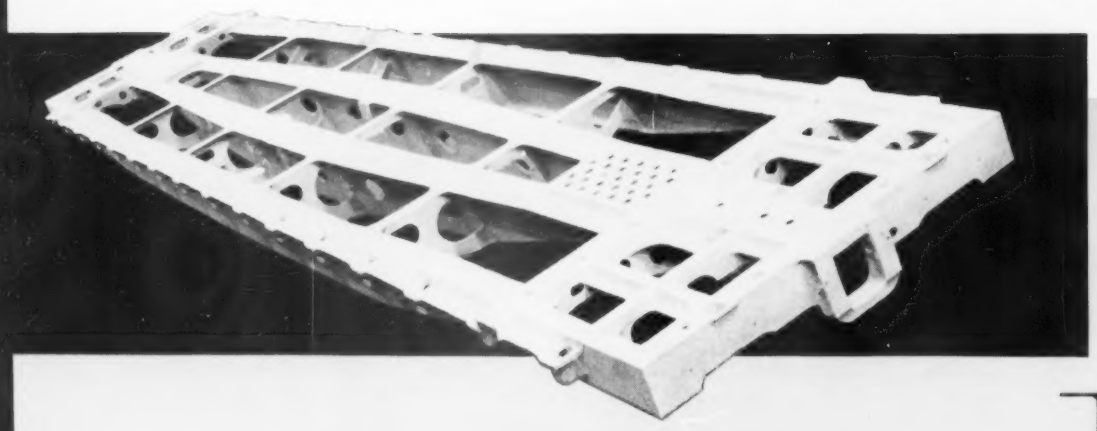
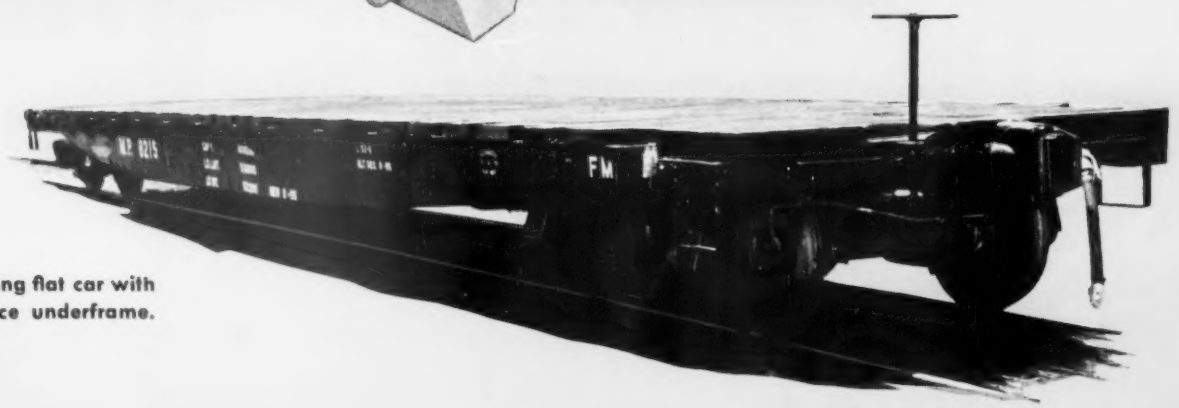
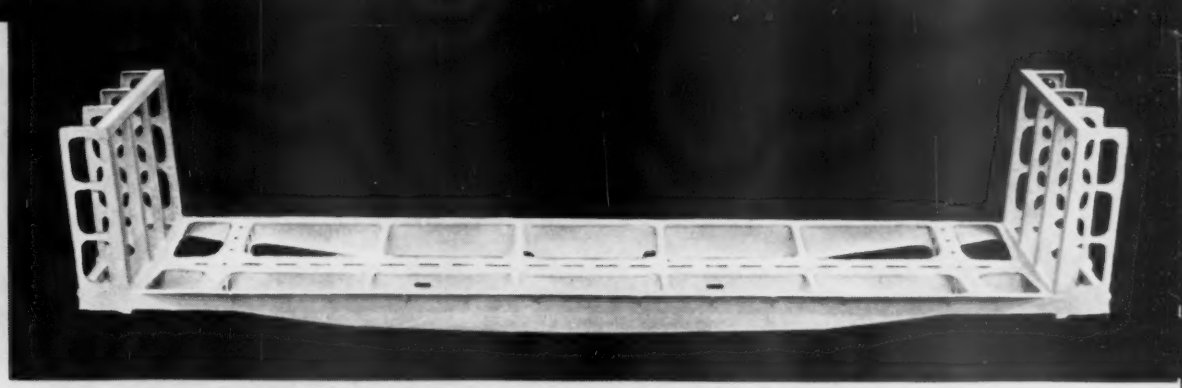


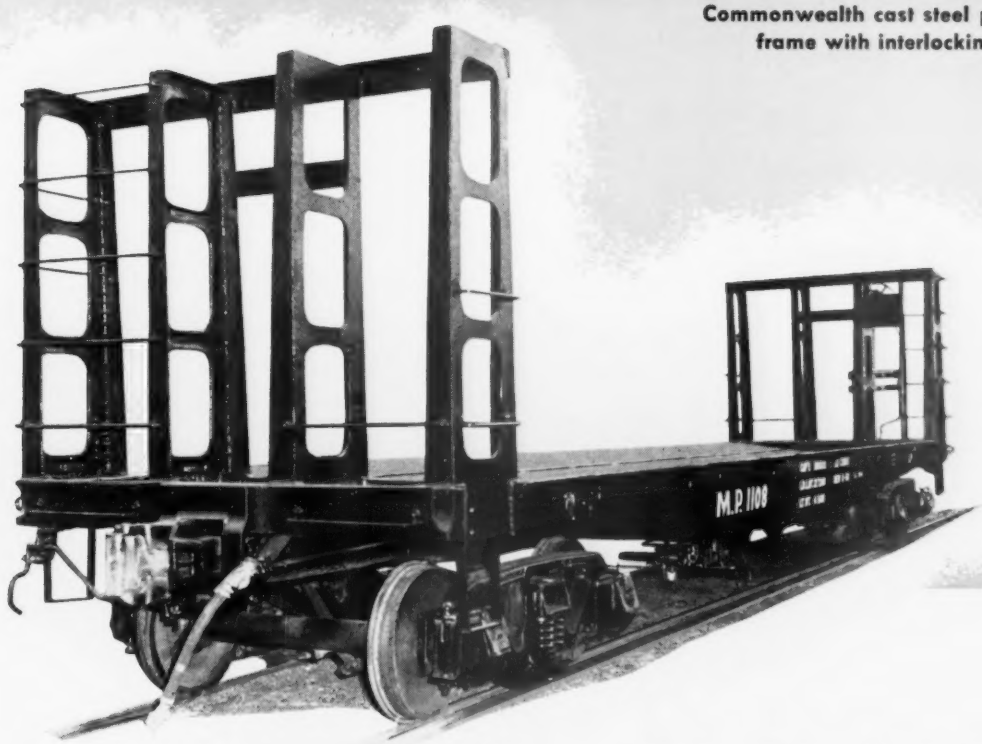
One-piece cast steel flat car underframe arranged for application of end bulkheads.



53'6" long flat car with one-piece underframe.



Commonwealth cast steel pulpwood car underframe with interlocking upright ends.



Pulpwood car with Commonwealth one-piece underframe.

maintenance-free Underframes

The Missouri Pacific Railroad has placed its *fifth* order for Commonwealth one-piece cast steel Underframes which the railroad will use to build 200 70-ton pulpwood cars. In addition, a lot of 50-ton flat cars with Commonwealth Underframes is in service.

Looking ahead to what may well be a continuation of the present period of rising costs, the Missouri Pacific is assured of years and years of maintenance-free underframe service and lower upkeep costs per car.

Many, many years of service have proven that flat cars, pulpwood cars and other types of quality freight cars with Commonwealth Underframes assure superior, better-built equipment. They provide maximum strength at minimum weight, longer life, freedom from corrosion problems and greater availability with increased revenue. Car construction is simplified.

Thousands of flat cars and pulpwood cars with Commonwealth Underframes in service on many leading railroads are proving their exceptionally long life and the sound economy of the investment.

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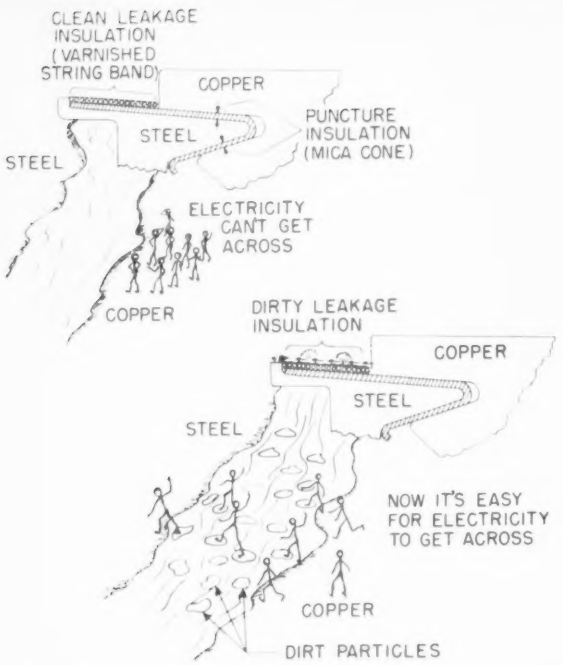

Fig. 5—How dirt on insulation lets electricity creep across.

on incoming machines have quite a bit of useful life left in them. If they are ruined, a sizable item is added to the repair bill, especially if there is a large volume of cleaning being done.

Parts exposed to operation in gear lubricants may be very hard to clean, especially if the lubricant has hardened. You may have to back up the cleaning with hand scraping or chipping to remove the hardened compound. Sometimes, in desperation, the old compound is burned off with fire. This is very bad practice. It is difficult to control the temperature, and you run a very real danger of affecting the heat treatment of important parts like pinions and gears. As a result the life of these parts can be seriously shortened. High temperature can also distort the gear case and warp it out of shape. Then there may be trouble in reassembling because of bad fits and damaged seals. Gear cases in this condition will leak excessively, endanger the gearing, mess up the trucks, and lubricate the roadbed instead of the gearing.

The higher horsepowers being transmitted through motor gearing today make the gear case an importan piece of machinery. Cleaners strong enough to remove gear lubricant will usually destroy the felt rubbing seals. In any event it is a good idea to replace the seals with new ones. And don't overlook the gaskets in the filler opening lids. When the gears are running they throw lubricant all around in the gear case. It will escape at the lid as well as at the axle bore unless the seals are on the job.

Metal surfaces not only get dirty, they also oxidize. This is the result of chemical combination of the metal with the oxygen of the air and is specially bad on parts that have been overheated. This oxide is most troublesome when it occurs on brass contacts, such as terminals or brush holders. There it causes heating because of its high resistance to the flow of electric current.

Oxide can be removed by hand sanding or abrasive blasting. Another method commonly used is acid pickling. This is an old method of removing oxide and brightening up the metal surface. All dirt and grease must first be removed from the parts. Usually this is done with a strong alkaline detergent in a hot water tank. The part is next rinsed in water and then placed in a solution of nitric acid. When it becomes bright it is removed and rinsed. A word of caution: you are dealing with acid—be careful! Good ventilation is required over the tank to remove the dangerous fumes given off. Do not dip steel brushholder springs in acid. There is danger of hydrogen embrittlement which may cause them to snap. If you suspect this has happened, try baking the springs for four hours at 200 deg C (392 deg F). Also, be sure that no insulated parts get into the acid.

Cleaning Insulation

Cleaning mechanical parts is a straightforward process. Railroads have plenty of background and experience in this kind of work. When it comes to cleaning the electrical parts of the equipment we are apt to run into differences of opinions. Most of the problems have to do with the electrical insulation of machines. Dirt is still the villain. It may clog ventilating air passages, cause brushes to stick in holders, and create a fire hazard. The real concern, however, is that it causes the electrical insulation to break down. If not caught in time, this often leads to road failures.

What is the nature of insulation and how is it affected by dirt? Insulation doesn't do any work. It is the copper conductors that carry the current which magnetizes the iron. This magnetic force in a motor moves the train. In a generator, conductors moving through the magnetic field generate voltage which moves the current. Is the insulation just going along for the ride? What does it do? The answer is illustrated in Fig. 2. Insulation wrapped around a conductor is like the wall of a pipe. It keeps the electric current from escaping from the conductor, and makes it follow the proper path so that it does the job it should. In this sense, we can't get along without insulation any more than we can get along without the wall of a pipe.

The natural conclusion is that if we wrap enough insulation around the parts all electrical troubles will be at an end. This cannot be done, however, because there is only a limited space for the iron and copper which do the work. If most of this space is filled up with insulation the machine will not develop the power it should. Another thing, good electrical insulators are

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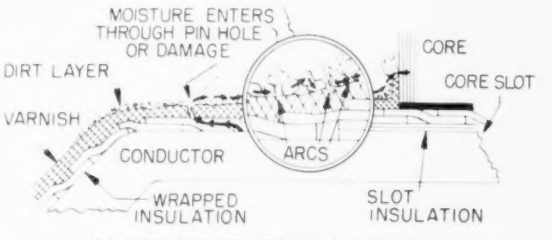

(A) DIRT AND MOISTURE ON INSULATION

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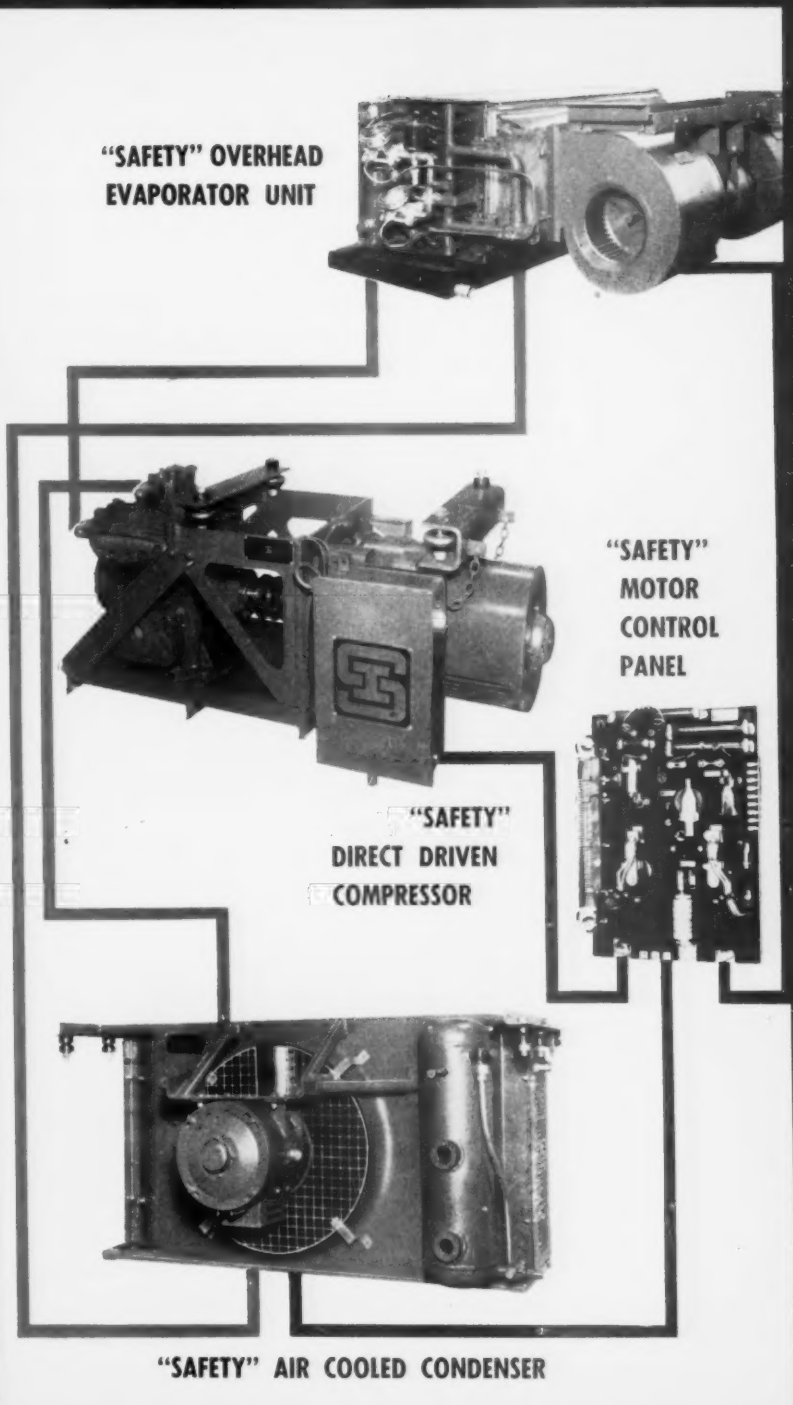
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also good heat insulators. For instance, if you hold one end of a glass rod in a flame the other end will remain cool. If you try this with a copper rod it will quickly get too hot to hold. If electric working parts are wrapped with too much insulation the heat can't get out and the parts will overheat.

Fortunately, insulators are electrically strong. Hence, a small thickness between conductors will easily insulate a machine for its operating voltage. Unfortunately, this very strength is the chief weakness of insulation. Because it is so thin it has very little mechanical strength, and is easily damaged by a blow, a scratch, or the action of chemicals. Once it has been damaged the operating voltage will burst through and cause a failure. It's very much like steam or water bursting through a rusted or damaged pipe wall. When in good condition the insulation is usually adequate to resist electrical puncture. If it is hurt by soaking or overheating, or if it is damaged by cutting or rubbing, it is liable to puncture. There isn't much that a shop man can do about the puncture strength of insulation. The designer determines this. Furthermore, such insulation is mostly inaccessible and hidden, being buried in the machine.

There is, however, another aspect of insulation that is very much the concern of the shop man and the cleaning program. This is the leakage or creepage surfaces of the insulation system. All electrical parts cannot be completely covered with insulation. The brushes and commutator, for instance, must be left exposed so that they can make moving contact with each other. The insulation around such parts is extended many many more times than the thickness required to resist puncture, as shown in Fig. 3. This is to separate the exposed electrical part from the nearest escape point by a wide surface and air space and keep electricity on the job just as if it were in a conductor wrapped with insulation.

Good examples of leakage insulation surfaces are found at the end of the commutator, Fig. 3. Here they are used to separate the steel parts from the copper segments that carry the current. The porcelain sleeve or other insulation separating the brush holder from the steel clamp holding the assembly to the frame is another example. Field coil terminals, Fig. 4, are spaced away from the poles and frame to provide the necessary leakage distance. From these examples you can get an idea of what we are talking about.

A creepage surface on insulation may be compared to a stream too wide to jump across, Fig. 5. If enough stepping stones are dropped into the stream it becomes easy to walk across without jumping. Particles of dirt on the insulation surface are like stepping stones. If enough of them collect, electricity begins to leak across and escape. At first this leakage is only a little trickle. Tiny twinkling sparks may be seen as the current moves across this layer of dirt. But don't underestimate these tiny sparks. If you could look at them through a magnifying glass they would appear vicious and hot, just like a welder's arc. These little arcs begin to burn and char the insulation. This makes a better path and allows more and more current to flow until the insulation fails completely. The entire power of the machine then breaks through the fault in a damaging blast. It's well worthwhile to clearly understand the nature of electric current leakage across insulation. The chief reason for cleaning is to remove the *stepping stones* of dirt on the creepage surface and bring the insulation back to normal.

The Nature of Dirt

Now let's see what kind of dirt it is that leads to all this trouble: The dirt found on insulation surfaces in railroad equipment is mainly in the form of dust. Often it is from 80 to 90 per cent carbon, iron, copper and sand. The carbon comes mainly from soot, smoke and carbon brushes. The iron comes from brake shoes and wheels. This iron dust is magnetic, so it is attracted by and clings to the magnitized parts of electric machinery. Copper is also found in the dirt as well as sand. All of these materials except sand are very good conductors. No wonder this dirt makes such a fine escape path for electricity when it settles on insulation surfaces.

If the dirt remained in the form of dry dust it could easily be blown off the smooth insulation surfaces. Railroads, however, operate in all kinds of weather, so the dust doesn't always stay dry. Moisture has a way of soaking into the dust and compacting it to make a better escape path. In fact, the moisture itself helps to bridge the spaces between the dirt particles and further lower the resistance to leakage currents. Also, moisture seeks out cracks and pin holes in the insulation which dry dust alone would not penetrate, as shown in Fig. 6.

Even by itself moisture can be a bad actor. When it settles on or soaks into the insulation it usually has conducting material dissolved in it. This makes it a ready conductor of electricity. Let's see what happens when current flows through a film of water on an insulating surface. The heat generated causes the moisture to evaporate from the leakage path. Finally the thin water film separates into little wet islands. The current then appears as twinkling sparks between these wet spots. As the space between the wet areas gets

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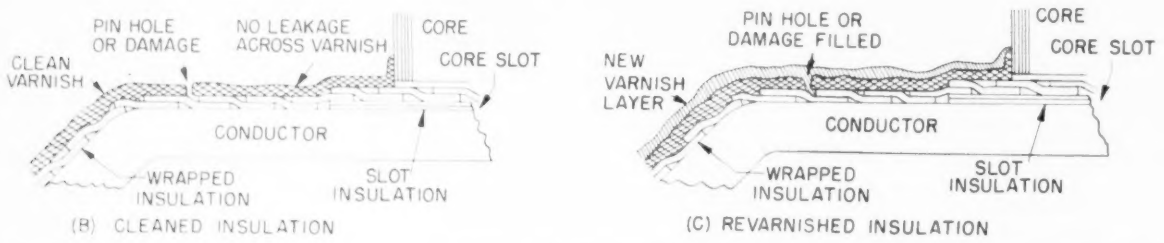
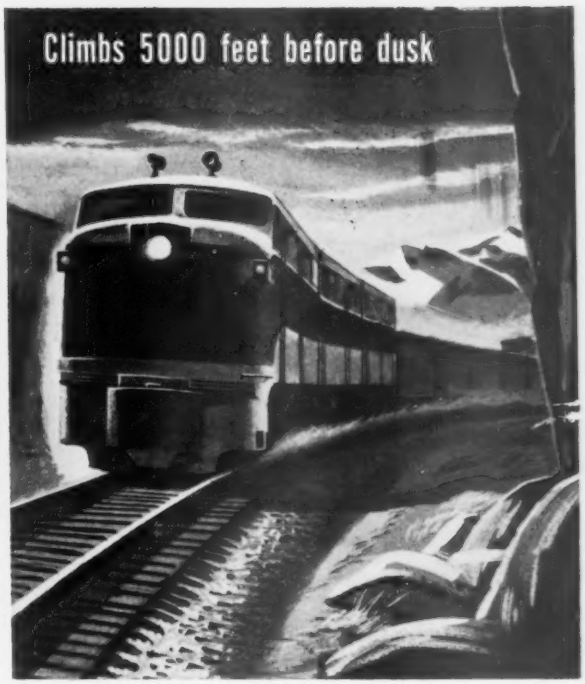


Fig. 6—(6A appears on page 62, 6B and 6C above)—Moisture helps insulation break down, but cleaning and revarnishing protect it against such failure.

This job isn't as tough as it looks...



NATIONAL BRUSHES *assure*

balanced performance ***under all operating conditions!***

Long brush life, excellent commutator condition — "National" brushes assure both on all types of equipment, in all classes of service. Reason for such remarkably *balanced performance:* NATIONAL CARBON'S long-term brush development *specifically for railroads.*

Millions of test-miles prove out each "National" brush grade. And there's a fully tested brush for every diesel-electric traction motor and generator requirement. Ask your "National" brush man to show you why his brushes outsell all others combined.

BALANCED PERFORMANCE ASSURES:

LONG BRUSH LIFE — stands up under constant shock and long, hard runs.

EXCELLENT COMMUTATOR CONDITION — superior film-forming qualities preserve commutators and assure smooth, quiet running.

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Best for all types of equipment . . . preferred for all types of service

UNION CARBIDE

The terms "National", "Union Carbide" and the Silver Colored Cable Strand are registered trade-marks of Union Carbide Corporation

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larger these electric arcs are drawn out and begin to char and burn the insulation. Now it's a race between how fast the water dries up and how fast the current burns into the insulation. You're lucky if the water dries up before permanent damage is done. If a track is burned across the insulation where it can't be reached, that part of the machine may have to be rebuilt. This explains why electricity should never be applied to a wet machine. It's a good point to keep in mind when handling machines that have come through rain without adequate protection in shipment or that have been removed from water after a wreck. It is also something to watch out for if the machine has been stored in a damp place for a long time.

Other Enemies

Dust and water are not the only enemies of insulation. Oil is another trouble maker, especially on diesel-electric locomotives. The diesel engine and other mechanical equipment have a habit of spreading oil and oil vapor to everything in the vicitnity, including electric equipment. Perhaps it seems strange to think of oil as being bad for insulation because, by itself, it is a very good insulator. However, it has one serious fault: it collects dirt and holds onto it. That's why it is used in air filters as a dirt-catcher. In the same way, an oily deposit on the insulation surface collects dirt and causes it to stick. There it forms a thick muck that resists every attempt to blow it away. Washing is the only way this oily muck can be removed.

Not only does oil make dirt stick to the surface of insulation, it also creeps in between the layers of insulation, Fig. 6, and carries the dirt with it. This action is something like that of moisture. In addition, when some oils are exposed to air they break down chemically and develop an acid reaction. This, of course, is bad for insulation.

There is still another kind of dirt which resists removal by either blowing or washing. It is a very thin conducting film stuck tightly to the insulation surface, something like a smoky coat of grime. Squirting washing solutions on it makes it look shiny and you may think it is gone. But as soon as the machine dries there it is, as dull as ever. This kind of dirt just doesn't wash off, it must be removed mechanically by a scrubbing action. The best method is to use an abrasive blast in powder or pellet form.

Cleaning Methods

Having seen the nature of the different kinds of dirt and how they act we know what we are up against. This is helpful in understanding what to expect from the different cleaning methods. Now let's look at several of these.

The simplest method of cleaning is to blow the dust and dirt off the insulation surface with compressed air. This is only effective when the dirt and dust are dry and readily moved by the air. Blow with a purpose; know what you are doing when you are doing it. Direct the jet of air where it will do good. Watch to see that you are getting the results you expect. Also, take into account where the cloud of dust is going to settle. There is no point in letting it spread all over the shop. There should be some means of removing the dust from the cleaning area. A hooded enclosure with at least three walls, ventilated by an exhaust fan is good. This constantly moves clean air into the work area and removes the dust-filled air.

Washing is another method of removing dirt from insulation, especially when it cannot be blown off. The simplest form of washing is done with a bucket of cleaning solution and a rag or brush to apply it, Fig. 7. This is an old standby and still has its place where only a small amount of equipment has to be cleaned. Although this method may seem very simple there are some fine points to it. The selection of the proper cleaning solution is one. While water with various detergents can be used, the general favorite is a petroleum or chlorinated grease solvent. Strong caustic solutions, if used, can be pretty rough on the skin, so the hands should be protected with suitable rubber gloves. Petroleum solvents are usually explosive and present a fire hazard. Insurance companies are emphatic about precautions that must be taken when choosing such a solvent. On the other hand, the fumes of chlorinated-type solvents are poisonous in varying degrees. They can even soak through the skin and get into the body. Furthermore, all these solvents can degrease you. Proper protection against these hazards must be provided.

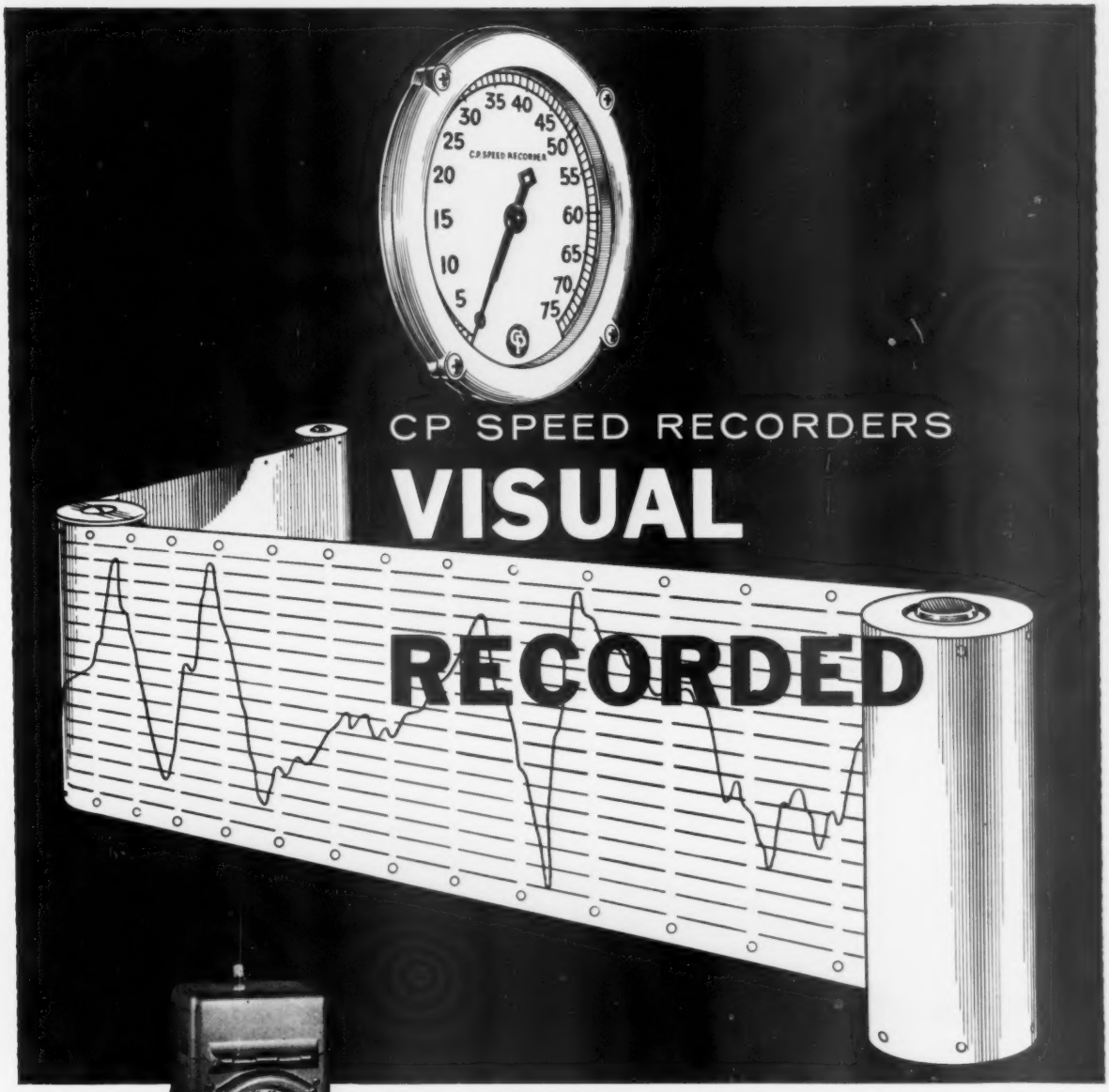
Adequate ventilation is an absolute necessity when using these solvents. The explosive or toxic hazard they create is usually measured by the number of parts per million (ppm) concentration in air. The object is to mix such a large volume of air with the solvent fumes that they become relatively harmless. There are different safety levels for explosion danger and poison hazard. These must be considered separately and the operation made safe on both counts. For instance, a ppm that might be safe from explosion could still be too toxic to work in, or vice versa. Check these matters with your safety department.

The so-called safety solvents are usually a mixture of petroleum and chlorinated solvents, combined in an attempt to blend the good features of both. Some of the less volatile solvents, while safer to use, tend to leave an oily film on the surface cleaned. This may be desirable for some mechanical parts, but is definitely out of place on electrical insulation.

There are many solvents and cleaners on the market, but the perfect one has not yet appeared. This ideal solvent should evaporate rapidly without leaving a residue. It should not harm electrical insulation, neither should it burn, explode nor be poisonous. A number of good solvents are in use, but each has its drawbacks. Carbon tetrachloride, for instance, is an excellent cleaner that was popular some years ago. As its use for cleaning electric machinery increased, however, more and more deaths were attributed to it. Today, many states have passed laws prohibiting its use for this purpose. It is a cumulative type of poison, that is, each bit entering the body stays until they add up to a fatal dose. Like fire and electricity, "carbontet" can be and is a useful servant; but, like them also, it can be dangerous when used without proper precautions.

There is one more thing to look into—the storage of solvents and cleaners. Suitable space and racks

(*Continued on page 68*)



CP Speed Recorders accurately indicate train running speed . . . keep clear, permanent tape records for evaluation of Operating Officials. Running time, acceleration, distance traveled, deceleration, slipping and sliding of wheels, and accumulated backward and forward movement are all recorded.

Two High Speed Recorder types are available for speeds ranging from 0 to 75 MPH and 10 to 120 MPH. Other models include Low Speed Recorders (0 to 15 MPH) that are ideally suited to the lower speeds required for humping cars and a 0 to 35 MPH unit for slightly higher speeds of the terminal area. Dual-control locomotives can be furnished with an auxiliary CP Remote Speed Indicator.

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

SPEED RECORDERS AND INDICATORS • PNEUMATIC AND ELECTRIC TOOLS
STATIONARY AND PORTABLE AIR COMPRESSORS • HYDRAULIC RIVETERS

with means for handling heavy drums and acid carboys must be worked out. It is important to arrange for a cool location. Remember, sunlight can put a lot of heat into a drum. If highly volatile solvents are stored in a hot place, pressure will be built up in the containers. Some solvents are best stored in underground tanks. Check your local safety and insurance regulations.

Beware of using aluminum containers for caustic and chlorinated solvents. Solutions of this kind have a nasty way of eating through aluminum, generating heat and dangerous gases in the process. Keep solvents in the steel drums made for them. Also, be careful not to let moisture get into chlorinated solvents. It forms an acid in the solvent. This speeds up the corrosive action on the drums and also on the parts washed with the solvent.

Individual experience and preference, as well as local industrial codes, fire and safety regulations all play a part in the selection of the cleaning agent and method. Visits to other shops are also helpful. As we all know, feelings play a large part in determining our choices. You might win if you play a hunch on the ponies; but be sure to get the facts before you bet on a cleaning method. Study the costs, production time, capacity and kind of a job done. Above all, remember that cleaning is not done for the sake of cleaning. It is one of the shop's most important jobs.

While parts may fatigue, fail and get wrecked, dirt is more like a disease that creeps up and causes good insulation to fail. For instance, during the Civil War more soldiers were killed by disease than by bullets. The chances of a wounded man surviving hospitalization were pretty slim. Why? Because of unsanitary conditions and inadequate treatment. If a railroad shop is run like a Civil War hospital the mortality rate on electric apparatus is bound to be high. Proper shop equipment and methods, clean surroundings, and a thorough workman like job will help keep your locomotives healthy and out on the firing line where they belong.

From the Diesel Maintainer's Note Book

Just for the Ride

DIESEL ENEMY NO. 2 (our old friend *Carelessness*) got loose a few days ago and caused a failure that should never have happened.

A two-unit Alco diesel was dispatched from the terminal, apparently in good working order. A short distance out on the line, the engineer noticed that the train seemed to slow down more than usual when going up grade. The train was a comparatively light one, and the grade was not severe. He did not note anything that would explain the lack of power, so he continued on the trip until he reached a point where he needed the full power of his two units, and had to stop.

There was an embarrassing delay which resulted in a second delay to a passenger train. The passenger crew went over to the freight diesel to offer assistance. In a very few minutes, they found there was no control air on the lead unit. They also found that the control air supply valve was shut off and that the drain valve was shut off, and that the drain valve on the control air reservoir was open.

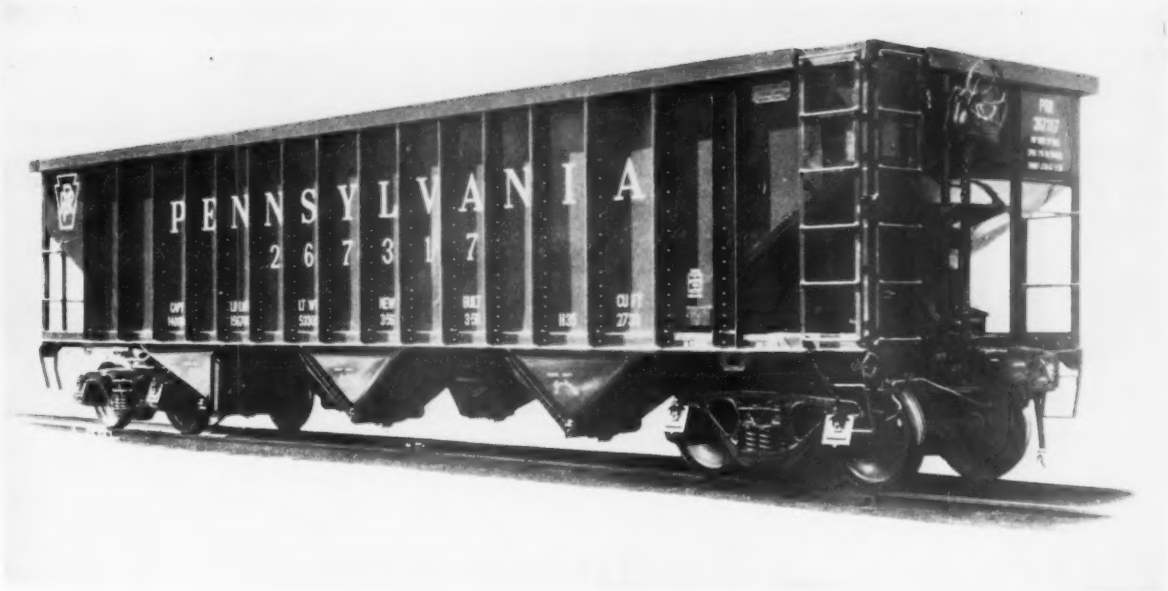
These valves (located in the nose compartment) were reset in the proper position and the trouble was corrected. This is another case where carelessness was displayed by both the maintenance force and the engine crew. The maintainers and the inspector should have known that control air was available before the unit was dispatched.

They were apparently fooled by the fact that the engine would "rev" up in response to the throttle, but had not checked to see that the various control contactors were operating so that the engine could deliver power.

The engineer had an excellent opportunity to detect the trouble if he had just looked at the load ammeter, which is on the panel in front of him. The load meter was not showing any loading whatever when the locomotive left the yard. In other words, the lead unit was just a loafer that was going along for the ride.

The unit that was improperly set up for operation—having arrived at its dispatching point being towed dead in the train in a move to transfer power. It had been set up for towing dead. Then it had been called for service, and the unit was not given a thorough control and power test to determine that it was okay for road service.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.



"Pennsy" standardizes on high strength low alloy steels containing nickel for ALL new hopper cars

Pennsylvania Railroad recently received delivery of a fleet of new 70-ton hopper cars.

The high tensile steel plates which contact the lading are expected to last approximately 50% longer than the carbon steel sheets formerly used in hopper cars of this type.

To provide this increased life expectancy, the "Pennsy" is standardizing for all new open-top hopper cars, on the use of high strength low alloy steels containing nickel, for all body sheets which contact the lading.

This policy provides extra strength, wear- and corrosion-resistance without adding to weight. As far as maintenance costs are concerned, the use of high strength low alloy steels permits the "Pennsy" to cut heavy repair work and "out-of-service" time in half.

High strength low alloy steels are ideal for railroad freight car bodies

They provide:

(1) Yield strength of 50,000 psi minimum in the as-rolled condition, which permits either:

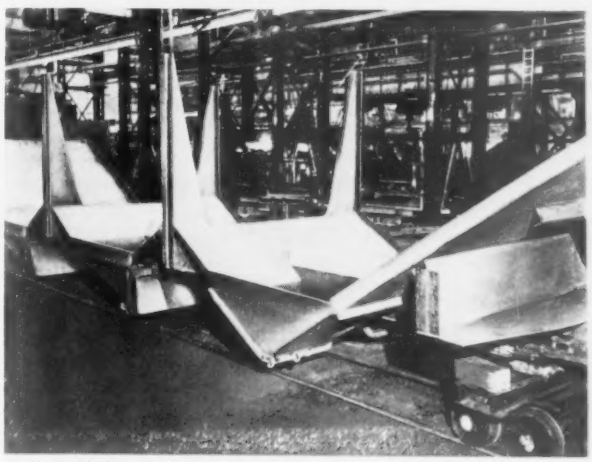
(a) appreciable weight reduction by using thinner sections . . . or

(b) if the same sections are used as for carbon steel, much better durability and minimum maintenance.

(2) Excellent response to usual fabrication operations . . . easy forming . . . easy welding.

(3) Good resistance to corrosion, abrasion and impact.

Send for "Nickel-Copper High Strength Low Alloy Steels." A copy is yours for the asking.



Stripped down hopper car shows the high strength low alloy nickel-containing steel sheets used in fabricating the PRR's new triple-hopper type cars. The use of high strength low alloy steels is expected to lengthen car life, reduce maintenance costs and provide greater equipment availability.

INCO TRADE MARK

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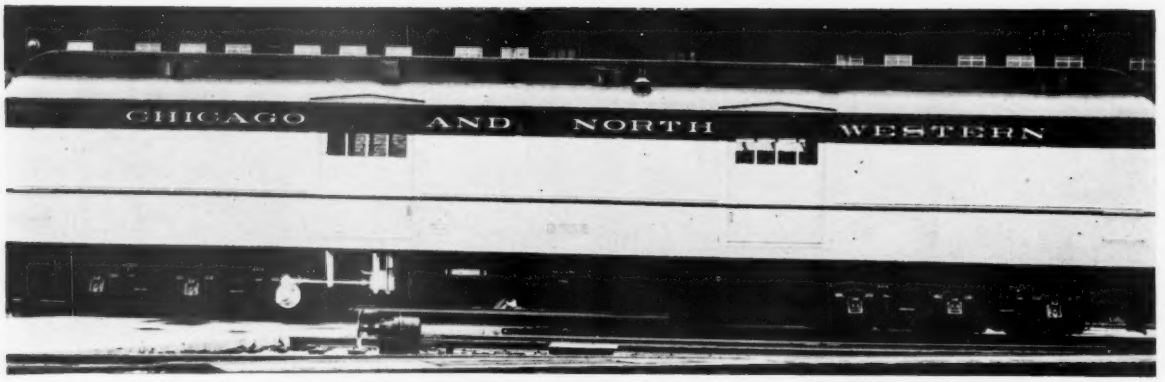


The drive and generator appear very small with relation to the size of the car.

Baggage Car Lighting Simplified

C & NW adopts system which employs outboard gear drive of self-excited inductor alternator

By L. E. Legg
Electrical Engineer
Chicago & North Western System

SOMETHING NEW in electric lighting of head-end cars is being tested by the Chicago and North Western. Baggage car No. 8616 is equipped with a 12-volt type A6H nickel-iron-alkaline battery of 255 amp-hr capacity. Charging is accomplished with a Safety Industries 1.5-kw, 15-volt, 2-phase inductor alternator through two bridge type power rectifiers. The alternator is capable of continuously delivering a rectified output of 108 amp at 14 volts. It has no slip rings, brushes, commutators, polarity changer, moving contacts or rotating windings. The machine is self-excited; therefore, it does not depend on battery energy for excitation.

Both output and field coils are encapsulated in epoxy resin, which makes the alternator entirely moistureproof and free from foreign matter.

The bearings are of the shielded type, requiring no lubrication between overhauls, which it is estimated will be a period of five years.

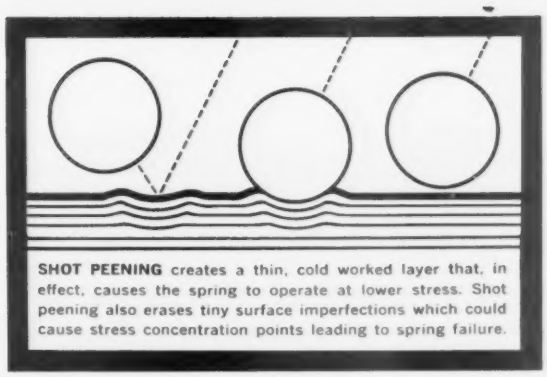
The moving element consists of two permanent magnet laminated rotors rigidly attached to the shaft which have a number of teeth equal to the frequency of the alternating voltage in cycles per revolution, and to half the number of poles in an equivalent synchronous generator. In this type of inductor alternator, the generation of voltage depends on a variation in air gap or magnetic reluctance to cause a flux linkage change in the armature coils, which, as stated before, are stationary. Tests have indicated higher efficiencies than equivalent synchronous generators of the same size. Even though this type of alternator has operated successfully at 20,000 rpm in other applications, it revolves at only 5,000 rpm at 100 mph in this operation. The cut-in speed is 700 rpm, and the rated speed is 7,000 rpm. Therefore, this railroad application is well within the rated speed limitations of the machine.

The alternator is driven by a Spicer positive gear drive, the power being transmitted from the end of axle through a coupling shaft to the gear unit, and thence, horizontally via a propeller shaft. The ratio is 5.28 to 1. This type of drive is fully enclosed; therefore, it is not affected by flying ballast, dirt, snow, rain or temperature. It is expected that maintenance will be at a minimum, inasmuch as the parts are light weight with spiral gears running on anti-friction bearings in a bath of light oil.

The inductor-alternator is cradle-mounted underneath the car, while the battery, rectifiers, voltage regulator and other electrical apparatus are mounted within a metal cabinet, located at one end inside the car. Inasmuch as nickel-iron-alkaline batteries give off nothing but hydrogen, they may be located in close proximity of control apparatus without fear of corrosion; and likewise, there is no objectionable odor or effect to the riders of the car.

The rectifiers have thermisters which limit the power output of the system, and which are also encapsulated in epoxy resin. This system will permit harmless short time high charging rates, but it will not tolerate harmful overloads. The protective

made stronger to last longer



SHOT PEENING creates a thin, cold worked layer that, in effect, causes the spring to operate at lower stress. Shot peening also erases tiny surface imperfections which could cause stress concentration points leading to spring failure.

cut bad-order car expense

You can help keep cars off the repair tracks with Crucible's *fatigue-resistant* springs. They're single heat treated and shot peened — *made stronger to last longer* — yet they cost no more than conventional springs.

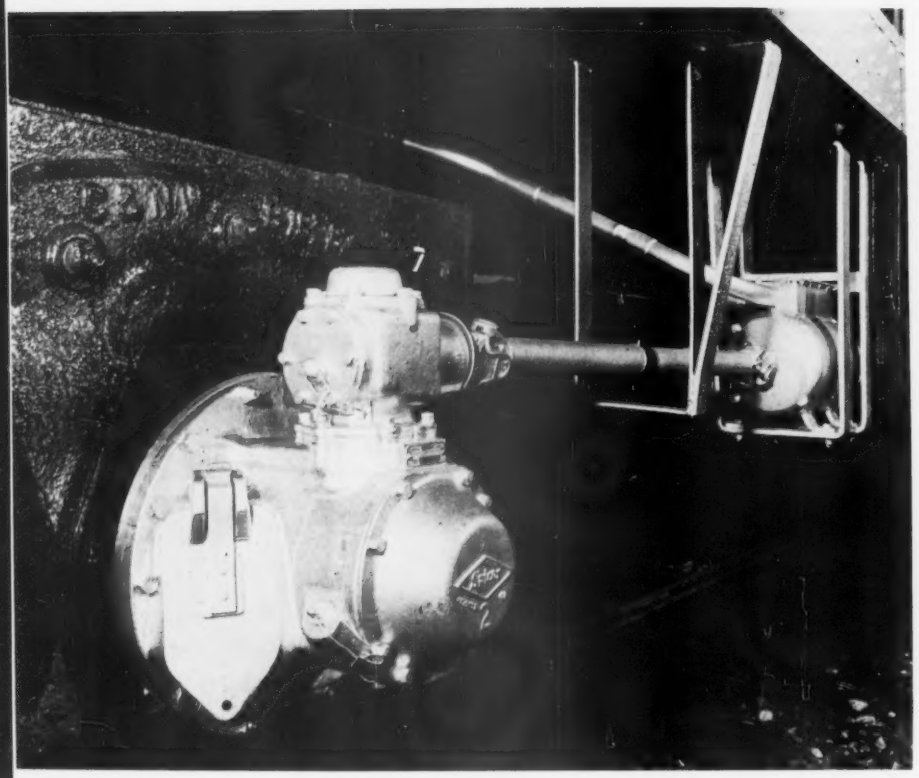
Because they last longer, Crucible *fatigue-resistant* springs reduce replacements due to spring failures–90% of which are caused by permanent set.

Fatigue-resistant springs can maintain their load-carrying capacities over longer periods because they have better hardenability, higher elastic limits and greater resistance to working stresses. Crucible ensures these qualities in every spring through strict manufacturing control from ore through final, rigorous compression tests.

Crucible single heat treated *fatigue-resistant* springs are your best guarantee of low-cost, long-lasting spring performance. For details, write for folder: *Spring Division, Crucible Steel Company of America, McCandless Avenue, Pittsburgh 1, Pa.*

CRUCIBLE spring division

Crucible Steel Company of America



The drive and generator have capacities greatly in excess of load requirements.

system functions on temperature of the rectifiers, rather than current control. This feature is in contrast to presently used systems which will not permit any overload whatsoever. It is not objectionable to recharge the battery at a high rate, after long stops.

Through the use of a second small rectifier and relay, all battery parasitic discharge is eliminated when the car is at standstill. No lamp regulator is used, as the voltage regulation is plus or minus 2 per cent over the entire speed range.

It is intended that this car will be entirely self-sustaining. There are no charging receptacles on the car and, of course, it cannot be trainlined.

Inasmuch as great abuse is frequently given batteries, due to careless standby charging, the optimum in battery life is expected from this new application.

Two principal reasons dictated the choice of the nickel-iron-alkaline battery for this baggage car application: (1) it will not freeze when discharged, and (2) the ability to accept extremely high rate of charge when in this state. Baggage cars occasionally stand for long periods at a time, and the lights are sometimes left on.

The lighting wiring is No. 10, and there are eight 25-watt lamps down the center line of the ceiling, and one 25-watt lamp over the desk, which provide ample illumination for working.

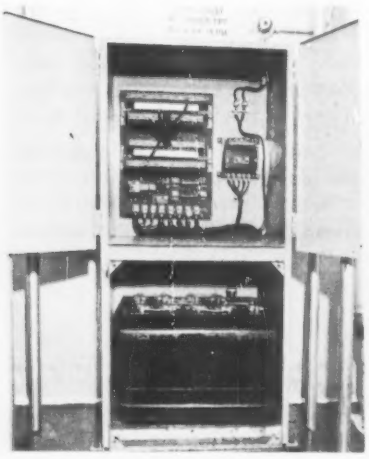
It is anticipated, that only one man-hour per month will be required for maintenance which should permit flushing of the battery, lubrication of the Spicer properler and coupling shafts, checking oil level in the gear box and blowing out the electrical cabinet. The initial test run was made on July 8 and 9, between Chicago and Duluth, Minn. Aside from the usual minor adjustments being required, the car has operated perfectly to date. Those who conducted the tests were Roy A. Slettevold, of Safety Industries, B. L. Mackey, of Thomas A. Edison Industries, Peter Sterniola, of the Dana Corporation, F. C. Ohlander, of DuBois Engineering Corporation, and the writer.

The above mentioned companies were the suppliers of the apparatus undergoing field tests.

Actual discharge tests reveal that the car has 20 hours of standby energy with all lights burning continuously and the car standing.

The cost of the installation was about one-third that of equipment used in the past, and the gross weight has been reduced by approximately 60 per cent. It has been estimated, that the cost of handling excess weight on railroads amounts to two mils per ton mile, which, if true, should justify an increase in capital investment of as much as $2.00 for each pound of weight saved.

C. J. Fitzpatrick, president, C & NW, announced that electric lighting of those baggage cars not already electrified is one of the steps being taken for improving the railroad's passenger train equipment and service.



A steel cabinet in the car houses the rectifier, control equipment and storage battery.

Eight 25-watt lamps down the centerline of the ceiling, supply general lighting.

General Electric Locomotive Cables

wherever overloads are a problem

Steep grades and heavy hauls often mean overloads on locomotive cables. In conditions such as these, insulation to withstand the resultant high copper temperatures without deteriorating is required. That's one of the outstanding advantages you get by rewiring with General Electric Versatol* Geoprene* locomotive cable.

Another is this cable's ability to stand up under other severe operating conditions. The tough, neoprene-base jacket will withstand flying pebbles, abrasion, vibration, flexing, and attack from such corrosive agents as oils, steam, detergents, and other cleaning compounds.

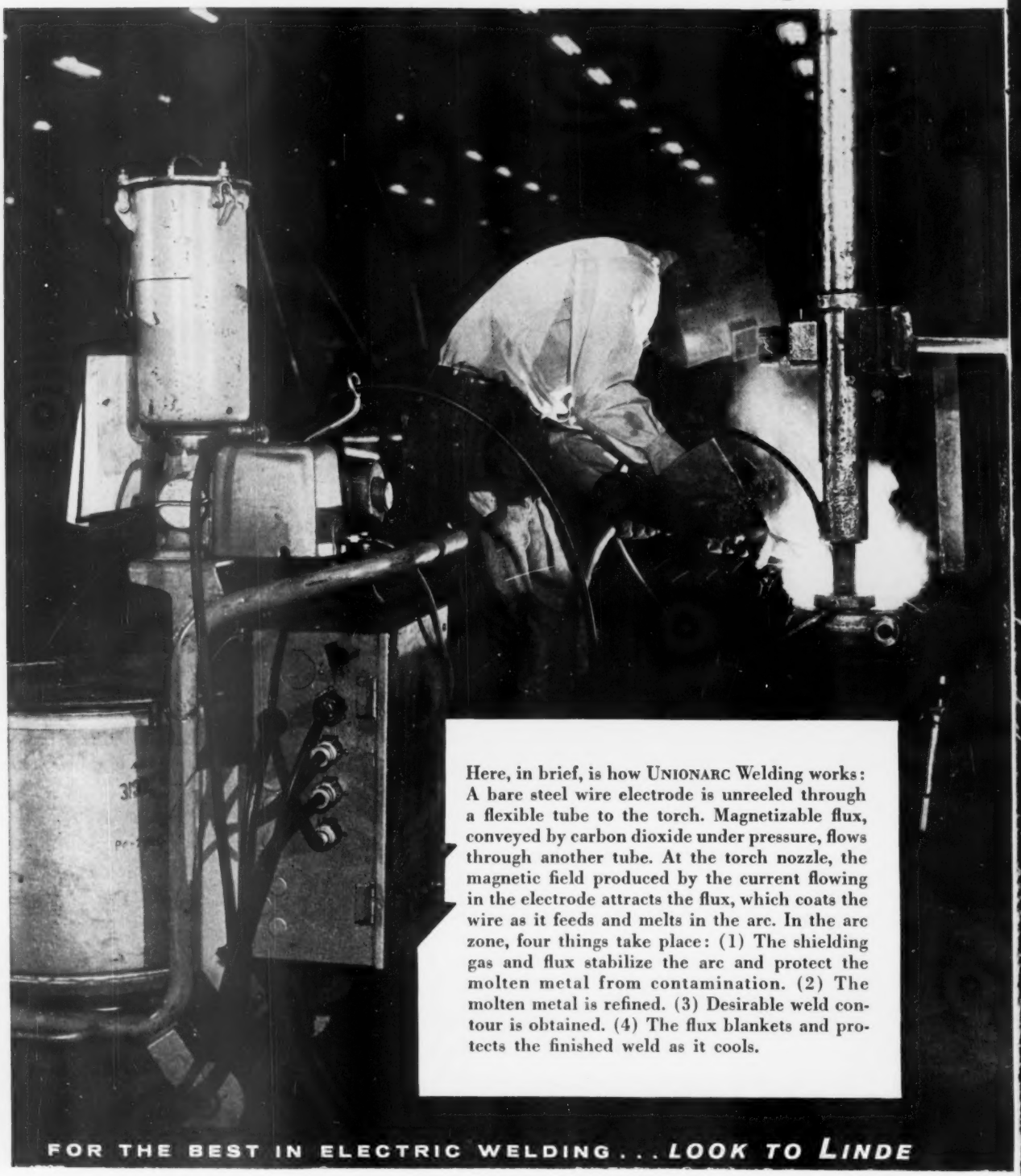
You get immediate delivery service, too, because Versatol Geoprene is stocked in a variety of types for all applications (even extreme temperature) right in conveniently located warehouses. For more information, write Section W214-947,, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

*Registered Trade-mark General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Now... LINDE offers you another UNIONARC Magnetic



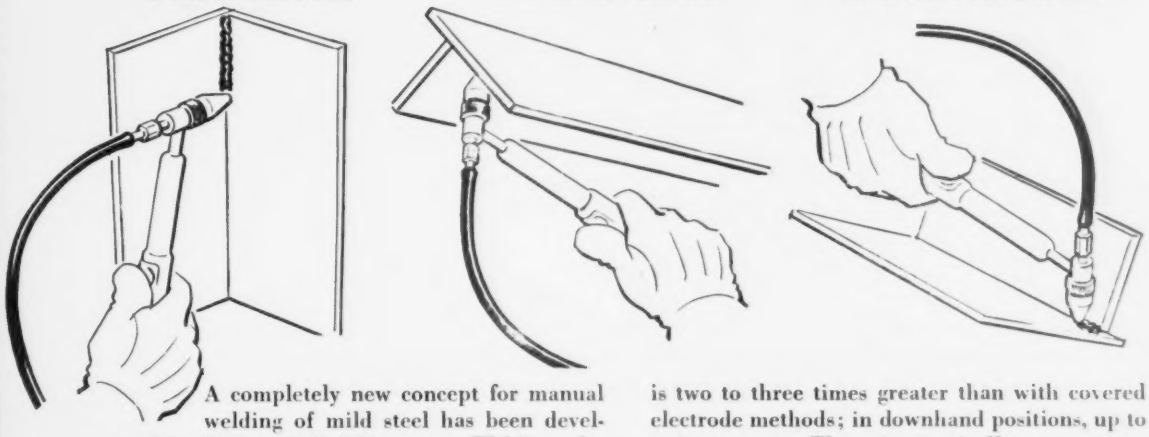
Here, in brief, is how UNIONARC Welding works: A bare steel wire electrode is unreeled through a flexible tube to the torch. Magnetizable flux, conveyed by carbon dioxide under pressure, flows through another tube. At the torch nozzle, the magnetic field produced by the current flowing in the electrode attracts the flux, which coats the wire as it feeds and melts in the arc. In the arc zone, four things take place: (1) The shielding gas and flux stabilize the arc and protect the molten metal from contamination. (2) The molten metal is refined. (3) Desirable weld contour is obtained. (4) The flux blankets and protects the finished weld as it cools.

FOR THE BEST IN ELECTRIC WELDING . . . *LOOK TO LINDE*

modern welding method—
Flux Gas Shielded Arc Welding

UNIONARC *is an entirely new method of welding steel in all manual positions...*

VERTICAL **OVERHEAD** **DOWNHAND**



A completely new concept for manual welding of mild steel has been developed by LINDE. Called UNIONARC Welding, the method uses a continuously-fed bare steel wire electrode, which is magnetically coated with flux and shielded by carbon dioxide. The torch can be easily handled in all welding positions—vertical, overhead, downhand. Manual welds can be made at higher speeds and at lower cost than with covered electrodes. UNIONARC Welding produces high-quality welds in steel, even when moderate amounts of rust, scale, and moisture are present.

Among the numerous advantages of UNIONARC Welding are these: Rate of operation is up to three times faster than with covered electrodes. There is no stopping to renew electrodes, since a single loading of wire can be fed smoothly and continuously for periods up to a week. Manual skill needed is no more than that required with covered electrodes. In vertical and overhead positions, the deposition rate in UNIONARC Welding is two to three times greater than with covered electrode methods; in downhand positions, up to twice as great. There is practically no spatter—the little that appears is easily brushed away, leaving a clean, smooth weld.

LINDE has made many notable contributions to welding. Among these are the introduction and development of submerged arc welding (UNIONMELT Welding), non-consumable electrode, inert gas shielded arc welding (HELIARC Welding), and the development of Sigma (shielded inert gas metal arc) welding. LINDE's newest method, UNIONARC Welding, is another *first*—a truly important contribution. Its simplicity and versatility make it unique. Its efficiency and economy have been proved in actual production work. Write *now* for details about new UNIONARC Welding, or better still, get complete information at Booth No. 280, Allied Railway Supply Association exhibit, September 15-18.

RAILROAD DEPARTMENT
LINDE COMPANY
DIVISION OF **UNION CARBIDE** CORPORATION

In Canada: LINDE COMPANY,
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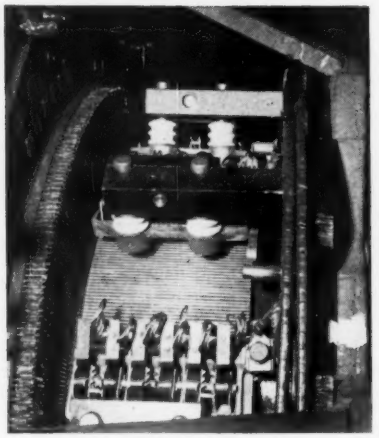
The terms "Linde," "Heliarc," "Unionmelt," "Unionarc," and "Union Carbide" are trade-marks of Union Carbide Corporation.

30 East 42nd Street, New York 17, New York

How Much Do You Know About Brushes



What Can Be Done About Copper Dragging and Threading?

TO THOSE OF YOU who have never seen copper dragging or threadings, it appears as a shredding-out of the trailing edges of the bars and in various stages progresses from what appears as a wire-edge to a stage where the copper has been worked until it extends almost completely across the slot to the next bar. Whenever contact is made with the next bar, the copper burns out much as a fuse would melt and usually results in a pock-mark on the edges of the two bars at that point. All pock-marks are not necessarily caused by copper dragging. They can be the result of flashovers.

There have been several theories proposed for this effect. This much is certain. Copper cannot be worked in this manner without mechanical force. Assuming the generator to be in first class condition, the only force that can cause brushes to chatter and bounce is high friction. It follows then that high friction brushes may be pounding the bars to cause this cold working of the metal. We know that brush friction increases as a result of loss of the film laid down in commutation. We know that this condition has appeared in cases where a generator has idled for many hours at no load.

On the opposite side of the picture, it must be recognized that operation of brushes at very high current density for a prolonged period can also puncture and destroy or burn off the film. We then arrive at the same high friction brush chatter condition which appears to be the cause or at least one of the principal causes of copper dragging and threading. Copper dragging is very rarely seen on traction motor commutators. The main generator and auxiliary commutators are the principal bad actors.

Some persons have recommended the removal of brushes in the studs to increase current density in order to lay down more film. Regardless of the effect of this action, the proper solution is not in changing the electrical manufacturer's design, but lies rather in applying the proper brush grades. The loads on a generator are seldom predictable and removing brushes is asking for trouble. Some of the reasoning advanced for removal of brushes is fantastic in that it proposes brushes should be removed from only one polarity.

Another theory has been advanced which states that there is some evidence which indicates that a peculiar resonance condition exists in some cases between the main generator and the diesel engine crank shaft. At the present time, the writer is not inclined to accept this as a major factor in copper dragging. This opinion is influenced by the fact that there are many identical units which have been in operation for a long time with no trouble from copper dragging.

It may be that in a final analysis copper dragging is actually the result of the formation of a skin-like layer of annealed copper on the commutator bars caused by the high localized heat generated through pin-point sparking in normal operation over months or years of operative service. Work is being done in one location where copper dragging has been very severe to try to establish the validity of this theory by turning the commutators down a little bit further than would normally be done when copper dragging appears. If this work shows that the commutators again enjoy a long period of freedom from copper dragging, we would be inclined to recommend this treatment wherever copper dragging occurs. Certainly, it would be more to the point to remove two or three thousandths from the commutator, once every 12 or 14 months than to remove one to two thousandths every 3 or 4 months.

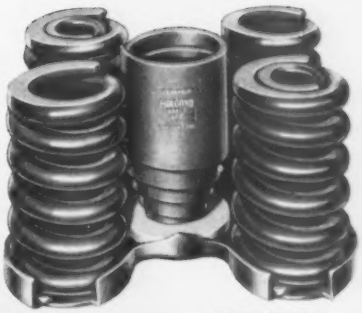
BY K. R. MATZ
National Carbon Company

This is the sixth of a series of questions and answers which are appearing each month.

HOLLAND VOLUTE SNUBBER SPRINGS

Upgrades ride by introducing an unusually smooth snubbing action with an exceptionally high load carrying capacity. Holland's principle of utilizing the sliding action of telescoping radially compressed coils eliminates the "wedging" problem.

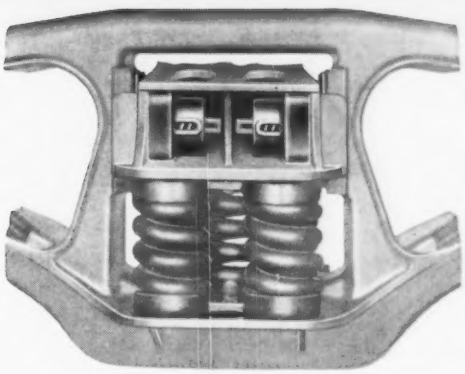
HOLLAND
Volute Snubber Springs, Either 1⅜" or 2½" Spring Travel



STYLE E-2
Volute Snubber Spring, 2½" Travel—in 50-Ton Group

HOLLAND

for the finest in Freight Car Truck Controls



HOLLAND BOLSTER CONTROL UNIT STYLE RS-2

An advance over all existing devices for upgrading freight car trucks to provide new truck riding qualities at a saving over new truck cost of 80%! A significant advance over the spring "package" method; utilizes the Holland principle of direct action, axially loaded members.

Modern high speed freight service is continuously increasing the importance of Holland's pioneering efforts and engineering accomplishments in the field of ride control. Whether for the **upgrading of existing trucks** . . . or for new trucks embodying the finest in proven control principles . . . Holland has answers that will increase safety and reduce to a minimum costly damage to equipment, lading and track. For complete information, write for Holland Bulletins, Holland Company, 332 South Michigan Ave., Chicago 4, Illinois.

You've Invited!

Please Come in and See Us at Booth Numbers
112 · 113 · 142 · 143
ALLIED RAILWAY SUPPLY ASSN. CONVENTION & EXHIBIT
Hotel Sherman, Chicago, Sept. 15-18

HOLLAND RIDE EASE TRUCK STYLE RE-2

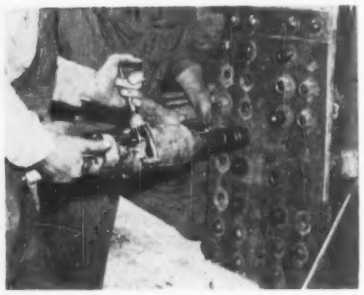
Introduces a new, yet thoroughly proven built-in bolster spring control following the same basic principle of direct acting, axially loaded friction members so successfully employed in the Holland Ride Stabilizer unit RS-1 for finest 3 way control . . . viz.: vertical, lateral and longitudinal.

EQUIPMENT

(*Continued from page 8*)

block bombarding and its controlled floating of the friction block permits full face bearing for tilt and out-of-square relationship between side frame and bolster to assure bolster control under all running conditions.

Other truck design features include long-life, hardened friction blocks; large diameter, low-stressed control springs; and hardened steel wear plates. Appreciably increased bolster end strength results from properly spaced and located vertical walls joining full top and full bottom members which, combined, from the housing for the friction blocks and control springs. The central retainer provides for retracting and retaining the friction block in the retracted position for truck assembling and dismantling operations. *Holland Company, Dept. RLC, 332 South Michigan ave., Chicago 4.*



Impact Wrench

The Impactool, an air-operated, torsion-bar, torque controlled tool, is a standard nut-running impact wrench with automatic control. A torsion bar is twisted to the desired stress on a simple jig, then locked with a calibration collar. Nuts are run on until the nut running resistance reaches the preset stress on the torsion bar, the impact mechanism rebounds tripping a rubber-faced shutoff valve.

Two sizes are available—a 534OT model, adjustable in a range of 14 calibrations to 550 ft-lb, or 90 ft-lb depending upon which of two torsion bars is used.

Larger tool runs both ¾ in. and ⅞ in. bolts. Its weight is 31½ lb and is 25 in. long, delivering up to 2,100 impacts per min. *Ingersoll-Rand Company, Dept. RLC, Phillipsburg, N. J.*

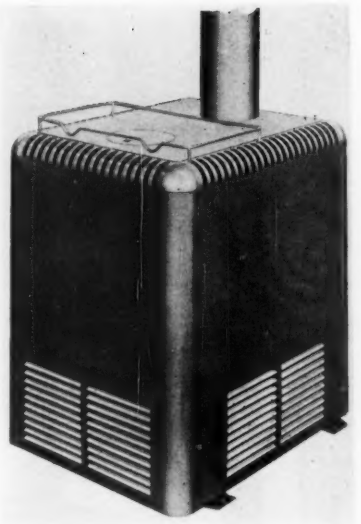
Decelostat Controller

This electronic anti-wheel slip device has been designed for application to lightweight trains where axle mounting arrangements and limited clearances prevent mounting of the AP-3 Decelostat Controller. Slip detection is by means of an alternator driven from the end of the axle. Source of the voltage developed is a magnetic pick-up impulse generator. No slip rings, brushes or rotating windings are required. Voltage proportional to speed is generated when the magnetic pick-up field is interrupted by rotation of a toothed alternator wheel. The control panel includes a means of checking the integrity of the circuits. *Air Brake Division, Westinghouse Air Brake Company, Dept. RLC, Wilmerding, Pa.*

Caboose Heater

The Superflame heater, which serves also as a cookstove, is rated at 53000 Btu and is capable of furnishing ample heat during frigid weather. It is equipped with a wide-range variable control for low heat on milder days. The unit is louvered on all sides along its top and bottom for maximum circulation of air. The heater burns number 1 or number 2 oil.

The unit is built for rough use in



cabooses and is equipped with a metering valve designed to automatically compensate for fuel overflow as the caboose is jarred during switching. Its combustion chamber is made of all-welded 18 gauge steel. Sturdy steel legs which are tapped for anchoring to the floor, set the chamber a full 6 in. off the floor. The heater is finished in a heat resistant platinum blond silicone paint. Dimensions are 30 in. high, 22 in. wide, and 28 in. deep. Its 20 in. by 16 in. cooking surface allows complete facility for cooking hot meals. *Queen Stove Works, Dept. RLC, 505 Front st., Albert Lea, Minn.*

Ratchet Lowering Jacks

These jacks are single acting in design for raising and lowering the load notch by notch, downstroke for raising and upstroke for lowering. They are constructed for heavy duty service and have a convenient carrying handle and a broad base to assure a solid footing.

(*Continued on page 80*)

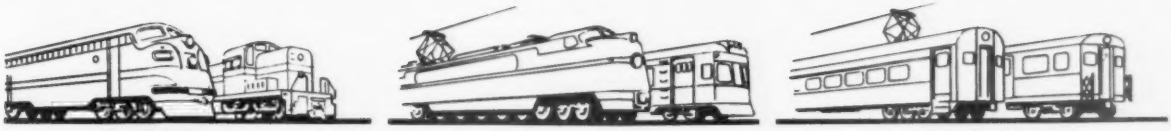
UNIT
A.A.R. Certificate No. 51

POSITIVE
A.A.R. Certificate No. 55

CHICAGO MALLEABLE'S BRAKE BEAMS

A. A. R. Y-40 Yokes and
Miscellaneous Steel Castings
Malleable Iron Car Castings

CHICAGO MALLEABLE CASTINGS COMPANY, CHICAGO 4, ILLINOIS
ALLIED STEEL CASTINGS COMPANY



DIESELS ELECTRICS MU CARS

ALL can have EXTRA, TROUBLE-FREE MILEAGE with Magnus traction motor support bearings

EVERY make and model of diesel-electric and electric locomotives or MU cars ever built can take advantage of the extra precision and trouble-free performance of genuine Magnus HIGH MILEAGE traction motor support bearings. These super-precision replacement bearings, designed and built by bearing specialists, can be obtained by any Railroad directly from Magnus Metal Corporation.

Each of the features at the right makes an important contribution to that extra safety factor found only in Magnus traction motor support bearings. And the present-day trend to higher mileage between motor overhauls call for this added cushion against costly breakdowns.

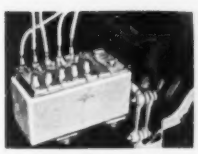
What's more, Magnus high-speed, high-precision production methods can manufacture these bearings so economically that relining or rebuilding is both unnecessary and impractical.

For the complete story on Magnus HIGH-MILEAGE traction motor support bearings, write for your free copy of Bulletin No. 6000, Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 6, Ill.

FEATURES

1. Perfectly mated bearing halves
2. Heat-resistant Satco lining metal
3. Interchangeable double keeway
4. High strength brass backs
5. Improved flange fillet profile — no "feathering," no "riding."
6. Precision finish boring to extremely close tolerances.

OTHER MAGNUS PRODUCTS FOR DIESEL LOCOMOTIVES



Wheel Flange Lubricators

Safety Valves

Fuel Tank Sight Gages

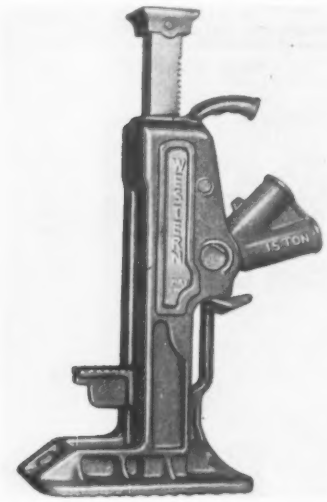
MAGNUS **High Mileage**

TRACTION MOTOR SUPPORT BEARINGS

MAGNUS METAL CORPORATION *Subsidiary of* **NATIONAL LEAD COMPANY**

EQUIPMENT

(*Continued from page 78*)



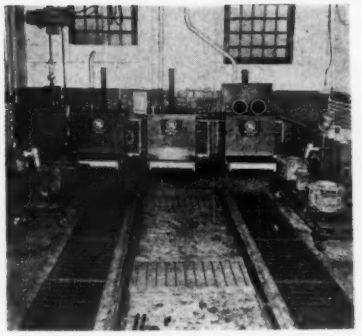
The jacks are manufactured in 5 models of from 5 to 15 tons capacity. In the fully lowered position, the lifting toe will engage load without interference by the base thereby maintaining high ratio of lift to closed weight. Heat-treated, forged steel rack bars are machined for tooth strength. Malleable iron housings with ribbed bases, multiple-toothed pawls and lever sockets with internal trunnions assure strength of jack mechanisms.

Illustrated is the model 2215-B with a rated capacity of 15 tons. Its closed height is 22 in. and it will lift 13-½ in. Base size is 7-½ in. by 11-¾ in. and it weighs 84 lb. *Western Railroad Supply Company, Dept. RLC, 2428 South Ashland ave., Chicago 8.*

Bearing and Journal Box Cleaning

At a Midwestern diesel railroad shop, old methods were being used for the cleaning of journal boxes, bearings and accessories from passenger cars and diesel locomotives. This shop was using a plain dip tank heated with a steam line and charged with soda ash and soap for the cleaning of journal boxes. One box at a time was lowered into the tank and boiled for a predetermined period. The crane, used for holding and lowering the journal box, was immobile till the cleaning was completed. An additional tank charged with solvent was used for hand scrubbing and soaking bearings and miscellaneous parts.

The old tanks have now been replaced with three mechanically agitated Aja-Lif machines and one soak tank. With this equipment, journal boxes are vigorously



agitated up and down through the solution 100 motions per min for 12 to 15 min. After cleaning, the boxes are transferred to a cold water tank where they are allowed to soak and to lower the temperature of the journal box for easy handling.

The other two units, equipped with roller work carrying platforms, are used for cleaning bearings. They are installed in the shop roller conveyor system to facilitate transfer of the parts.

Mechanical operation of these machines is accomplished with compressed air for they are motorless and gearless. The shop is now cleaning 15 to 20 journal boxes and bearing sets per shift. All hand cleaning has been eliminated. *Railroad Division, Magnus Chemical Company, Dept. RLC, South ave., Garwood, N. J.*

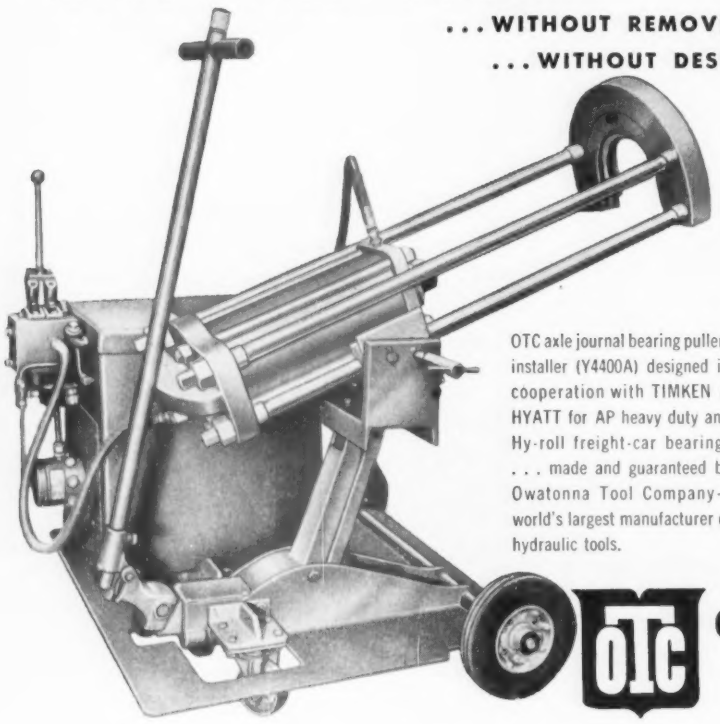
(*Turn to page 84*)

NOW—ONE MAN ... can pull, install axle journal bearings

IN MINUTES...

...WITHOUT REMOVING CAR WHEELS

...WITHOUT DESTROYING WHEEL FIT



OTC axle journal bearing puller-installer (Y4400A) designed in cooperation with TIMKEN & HYATT for AP heavy duty and Hy-roll freight-car bearings . . . made and guaranteed by Owatonna Tool Company—world's largest manufacturer of hydraulic tools.

Slash manhours—slash labor costs—slash lost time—with this new OTC journal-bearing puller-installer. One man has 74 tons hydraulic pressure on tap—muscle aplenty to remove even stubborn "frozen" bearings—and 53 tons pressure to press home the tightest fit.

Entirely self-contained, this OTC puller-installer rolls to the job on large wheels (two swiveling). Puller frame raises or lowers hydraulically to the right height, tilts to fit over axle-bearing assembly.

Puller-installer is complete with OTC double-acting ram, 2-horsepower electric motor, piston-type pump, 2-gallon hydraulic reservoir, 3-way hydraulic control valve, pressure gage, hydraulic lift for raising and lowering tiltable puller frame.

Complete details in OTC bulletin HYRR 57 —see your OTC representative or write

OTC **OWATONNA TOOL COMPANY**

495 CEDAR STREET

OWATONNA, MINNESOTA

Wheel production is soaring in the nation's leading railroad shops using Niles automatic cycle wheel borer with side head

Railroad shops of the nation's leading carriers are boosting wheel production —in some instances up to 300%— thanks to installation of Niles Hydraulic Wheel Borer with side head, and to other fast, efficient Niles railroad shop tools.

Pictured here is a new Niles wheel borer with side head for machining hubs, rims and collars, recently installed in an Illinois Central shop. Soon the Union Pacific, Elgin, Joliet & Eastern, and Milwaukee Railroads will join the industry as users of this money-saving shop tool. Automatic boring feed cycling keeps the machine in almost constant operation. And the addition of the side head makes it possible to handle car and diesel wheels on one machine.

Write today for a copy of the Niles Hydraulic Wheel Borer Bulletin—with complete specifications and operating data. Find out how you can materially cut your shop costs. Address Dept. 9030.

Pictured above is a new Niles wheel borer equipped with side head recently installed in Illinois Central's Burnside shop, Chicago, Ill.

ALL OF THE NATION'S LEADING RAILROADS ARE USERS OF NILES RAILROAD SHOP TOOLS

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

there's a HUCK fastener to fit every requirement of cost, strength and function. It will pay you in labor saving and improved product, to investigate the complete line of HUCKBOLT* FASTENERS and BLIND RIVETS. We invite your inquiry.

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HUCK MANUFACTURING COMPANY
2480 Bellevue Avenue
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FOR PROGRESSIVE RAILROADING

111,000 CARSETS TO DATE

MILLER PAD LUBRICATORS

Immediate Delivery IN Any Quantity

WINONA, MINNESOTA

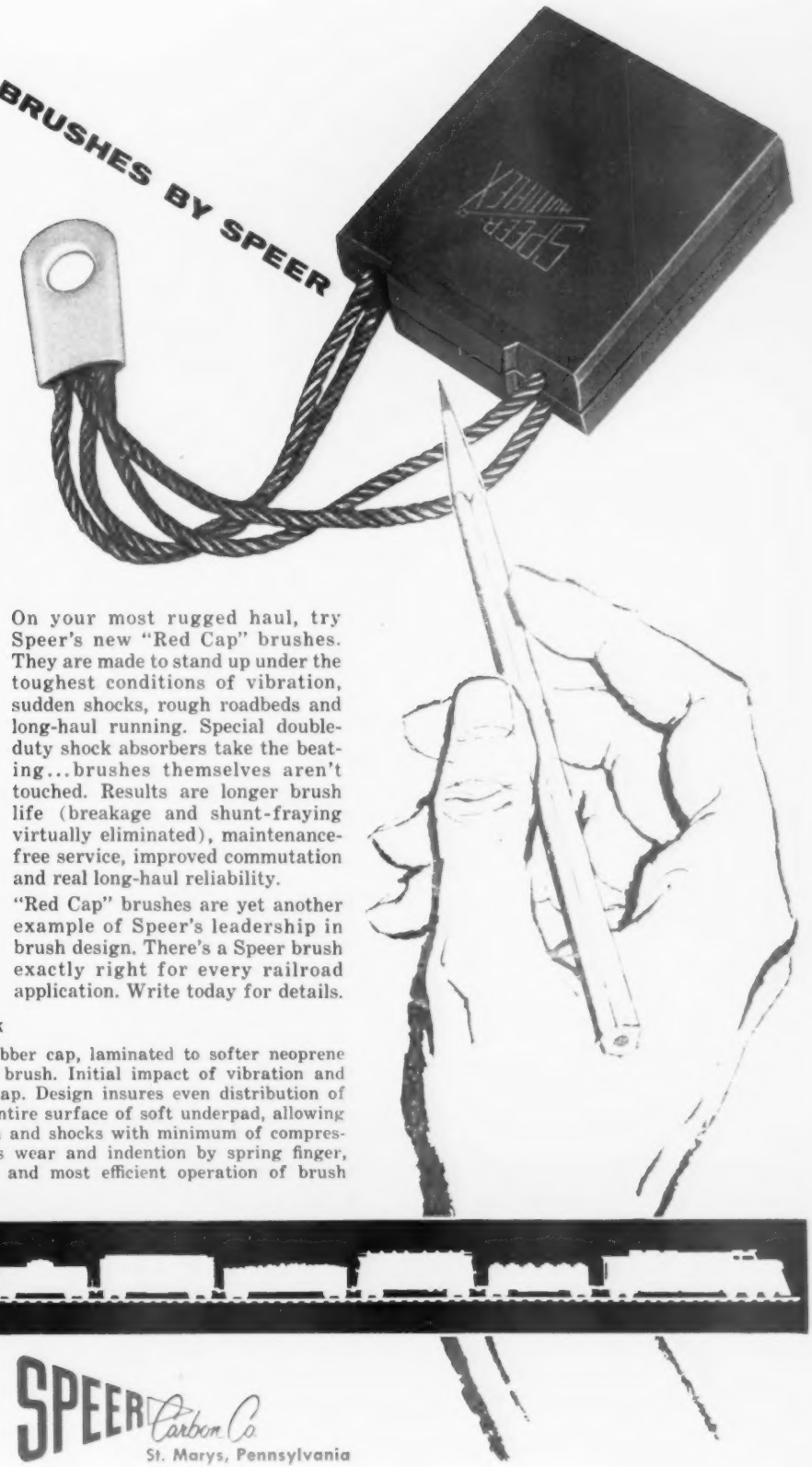
NAPANEE, ONTARIO

Your schedule of deliveries to either plant will be met as specified.

MILLER LUBRICATOR CO.
WINONA, MINNESOTA

NAPANEE IRON WORKS
Napanee, Ont., Canada
Montreal, Que., Canada

NEW "RED CAP" BRUSHES BY SPEER

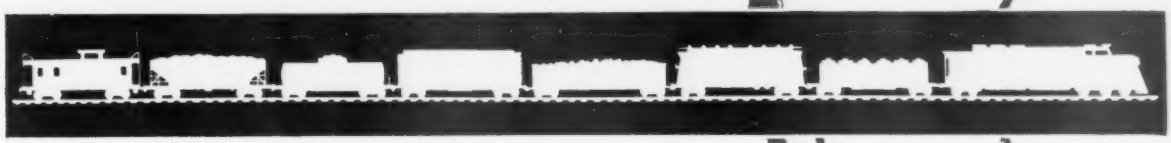


On your most rugged haul, try Speer's new "Red Cap" brushes. They are made to stand up under the toughest conditions of vibration, sudden shocks, rough roadbeds and long-haul running. Special double-duty shock absorbers take the beating...brushes themselves aren't touched. Results are longer brush life (breakage and shunt-fraying virtually eliminated), maintenance-free service, improved commutation and real long-haul reliability.

"Red Cap" brushes are yet another example of Speer's leadership in brush design. There's a Speer brush exactly right for every railroad application. Write today for details.

How "Red Caps" Work

Specially designed hard rubber cap, laminated to softer neoprene pad, is mounted at top of brush. Initial impact of vibration and shocks is broken by hard cap. Design insures even distribution of remaining pressures over entire surface of soft underpad, allowing full absorption of vibration and shocks with minimum of compression. Hard cap also resists wear and indention by spring finger, permitting free movement and most efficient operation of brush throughout its life.



SPEER Carbon Co.
St. Marys, Pennsylvania

Take a tip from
LEADING RAILROADS—
SPEED UP
DRILLING
and
TAPPING
WITH ERRINGTON
Adjustable Multiple
TAPPING and
DRILLING HEADS

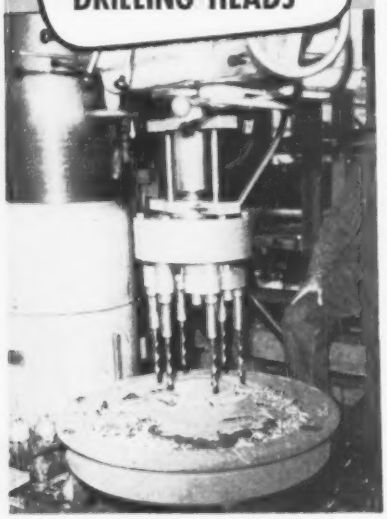


Photo of Diesel Locomotive Shop, Union Pacific R. R., shows Errington Multiple Drill holding six drills—(can also use six tap tools)—drilling passenger car wheel, to make-ready for attaching new style wheel brakes.

Here are versatile tools which permit you to take advantage of a wide range of adjustment—without overhang. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

Features: Fully geared. Needle bearings on all spindles in head. Ball thrust bearings throughout. Bronze bushed. Sand cast aluminum case. All parts fully enclosed for pressure lubrication and protection. Non-slip positive clamping on all adjusting members.

WRITE FOR COMPLETE INFORMATION

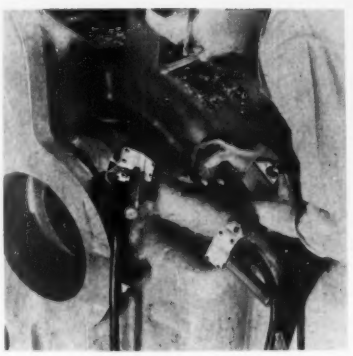
Established 1891
ERRINGTON
Mechanical Laboratory, Inc.
STATEN ISLAND 4, NEW YORK

EQUIPMENT

(Continued from page 80)

Quartz Tube Light Source

The 1500-watt tubular mercury quartz lamp shown was developed for New York's International Airport floodlighting. It is a completely new development in lamps designed for lighting large areas, and is made to operate in a special luminaire. The lamp-luminaire combination is expected to find wide acceptance for illuminating outdoor areas such as station parking lots, fueling stations, outdoor storage and construction areas, railroad yards, and in situations where high mounting is a requirement. It can also be used indoors in industrial high-bay areas. *General Electric Company, Lamp Division, Dept. RLC, Nela Park, Cleveland 12, Ohio.*



Permanent Magnet Leech

No. 54975 leech is said to increase efficiency by enabling one man to perform magnetic particle testing operations that formerly required two men.

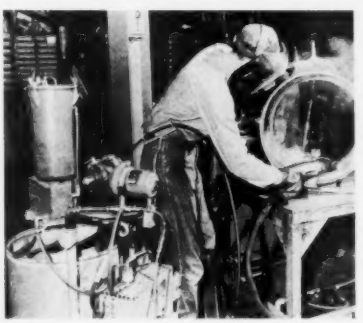
It consists of a permanent alnico magnet, cast steel pole pieces with an aluminum carrying handle, and five feet of 2/0 cable. The leech will remain and make electrical contact as long as desired on any magnetic surface, including vertical and overhead members. The magnetizing source may be a.c., d.c., or half-wave current, not exceeding 1500 amp.

The old method of dry powder magnaflux testing required two men. One man positioned a prod while another applied powder and operated a second prod. Once the leeches are in position, only one inspector is needed to operate and apply powder. *Magnaflux Corporation, Dept. RLC, 7300 West Lawrence ave., Chicago 31.*

Non-Peeling Coating

Specially prepared to be applied directly over new and unpainted galvanized, aluminum, or terne plate surfaces, this formulation called Galvinoleum Coating, is available in red, gray, green and metallic colors. The manufacturer's outside white, or any high-quality oil base house paint, may be used over the coating to match desired trim color.

The coating is said to take hold and thereby eliminate paint peeling problems. Tedious etching of the galvanized surface, as well as weathering, are now eliminated. Gutters, downspouts, siding, roofing, heating and ventilating ducts are other items that can be covered with the product. *Rust-Oleum Corporation, Dept. RLC, 2799 Oakton st., Evanston, Ill.*



Welding Process

Unionarc welding, an electric process, is a new concept in the manual welding of mild steel. It is said to reduce welding costs 25 to 65 per cent below those of existing welding methods.

The Unionarc process uses a continuously fed bare steel wire electrode which is magnetically coated with flux and shielded by carbon dioxide. The torch can be easily handled in all welding positions—vertical, overhead and downhand. Manual welds can be made at higher speeds than with covered electrodes according to the manufacturer. Unionarc welding produces high-quality welds in steel, even when moderate amounts of rust, scale, and moisture are present. *Linde Company, Division of Union Carbide Corporation, Dept. RLC, 30 East 42nd st., New York 17.*

(Turn to page 86)

STRONGER SILLS FOR
WIDER DOORS

M·F

Threshold Plates

are permanently welded structural members of the car . . . they provide more rigid openings — *more necessary than ever with wider doors!*

Floor boards don't pass under the 'M-F' Threshold Plate — worn or broken floor boards are more easily and more quickly replaced.....

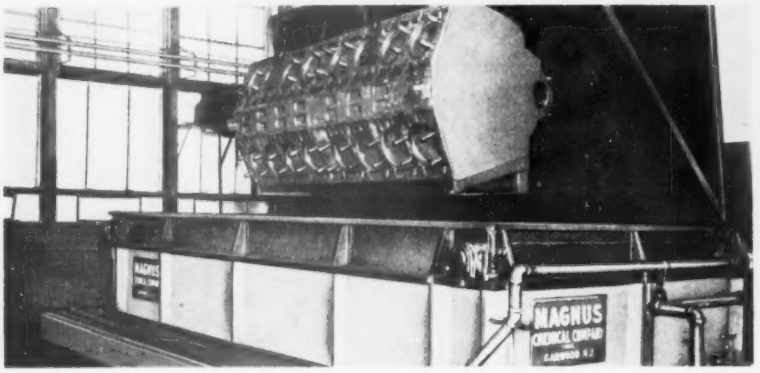
AND with the 'M-F' Threshold Plate uniform length floor boards may be used throughout the car.

MAC LEAN-FOGG

Lock Nut Company

5535 North Wolcott Ave., Chicago 40, Illinois
In Canada: The Holden Co., Ltd., Montreal

FROM the smallest injector parts



TO the largest diesel engine block . . .

MAGNUS MACHINES ARE RIGHT FOR YOUR JOB

. . . Save Labor . . . Save Money

Whatever your cleaning job . . . from the smallest injector parts to the largest diesel engine blocks . . . Magnus has the right equipment to do the job better, with less labor and less cost.

Offering a wide range of equipment, from the small, inexpensive MIJI-DIP CLEANING MACHINE, through a varied selection of flexible AJA-DIP and AJA-LIF's, to giant, custom machines capable of cleaning 6 ton diesel blocks, Magnus machines with their proven principle of mechanical agitation are the answer to lower cleaning costs in the face of rising labor costs.

SEE MAGNUS CLEANING MACHINES IN OPERATION AT A.R.S.A. EXHIBIT BOOTHS 346-347-348

For full information on Magnus Cleaning Methods, simply write to Magnus, 77 South Avenue, Garwood, New Jersey

magnus

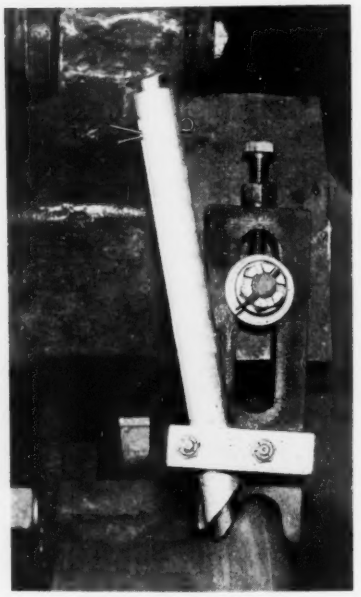
RAILROAD DIVISION

MAGNUS CHEMICAL CO., INC.

a world-wide organization specializing in cleaning and protection of all surfaces

EQUIPMENT

(Continued from page 84)



Flange Lubricator

This type TA flange lubricator is claimed to offer greater ease of installation, and a swivel mounting which eliminates clearance problems and permits replacement of the dry molybdenum disulfide stick lubricant without removal of any part.

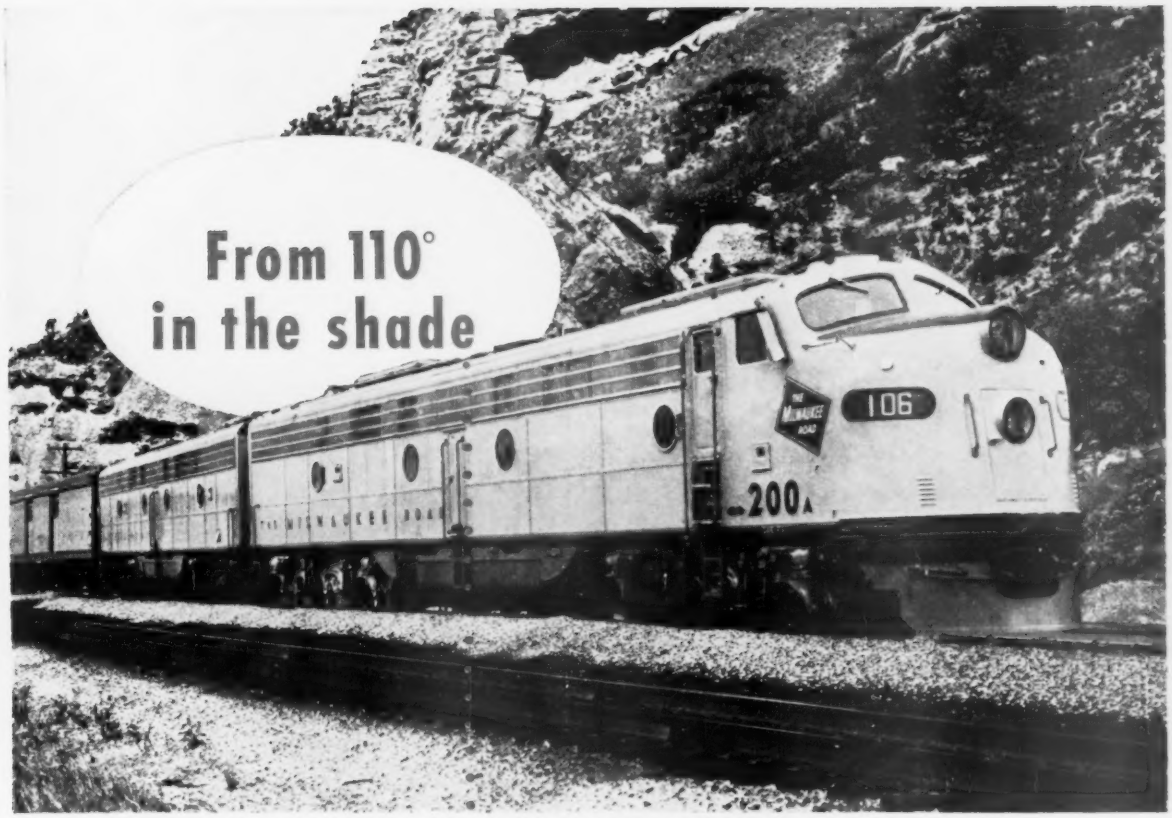
The lubricator interferes in no way with the application of new brake shoes. Adjustment of guide shoe is simplified and positive, and suspension mounting prevents grabbing and chaffing while applying lubricant smoothly and uniformly. "Moly-Stick" lubrication is said to possess high film strength under extreme pressures, and will not pick up dirt or sand. *National Aluminate Corporation, Dept. RLC, 6190 W. 66th Place, Chicago 38.*

Hydraulic Jacks

These hydraulic jacks, designed for horizontal or vertical operations, are available in 14 models, ranging from 3 to 100 tons' capacity. The light duty models from 3 to 20 tons have single speed control. Two-speed control is standard on all other models. Suitable valves afford positive control of ram under all loads. Spring retainers keep ball valves in seated position when unseated by hydraulic operation of pumps or release valves.

Hydraulic fluid used in the jacks is compounded to give maximum protection against sluging or oxidation, rusting and foaming. It will flow and lubricate at sub-zero temperatures. All jacks in the line can be fitted with pressure gauges. Dials can be calibrated to indicate total

(Continued on page 88)



to 40° below
PROTECTED BY SINCLAIR

During some of The Milwaukee Road's long runs of over 2200 miles from Chicago to Seattle and Tacoma, altitudes range from sea level to 6000 feet; frequently temperatures vary from 40 below zero to sizzling 110° heat.

It's a tough test for Diesels – and for Diesel lubricating oil. That's why The Milwaukee chooses Sinclair GASCON® Diesel Lubricating Oil to lubricate and protect many of its mighty Diesel engines.

Fact is – over 100 leading U. S. railroads use Sinclair GASCON Oils. Because of this wide popularity, GASCON Oils have become established as a *standard of comparison* for Diesel lubricating oil performance.

It's time that you, too, looked into the advantages of Sinclair GASCON Diesel Lubricating Oils and Diesel Fuels.

SINCLAIR RAILROAD LUBRICANTS

Sinclair Refining Company, Railway Sales, 600 Fifth Avenue, New York 20, N.Y • Chicago, St. Louis, Houston

The easiest way to restore commutators in traction motors and generators without dismantling during interim maintenance...or during periodic overhauls. IDEAL Resurfacers and other tools are used by leading railroads and recommended by locomotive builders.

RESURFACERS

Refinish commutators to like new condition even when ridged, scored or burned. Wood block handles clamp rigidly into grinder. Seven sizes, in all grades from extra coarse to extra polish.

MICA UNDERCUTTERS

Work easily in close quarters. Several models. Direct drive or by flexible shaft. For use with IDEAL Commutator Saws and Milling Cutters.

FLEXIBLE ABRASIVE

Cleans and burnishes commutators. Non-dusting. Complete size range.

CLEANER-BLOWERS

Blows air at high velocity and harmless low pressure. Lightweight and rugged. May also be used as a vacuum cleaner or sprayer. Three models: $\frac{2}{75}$, $\frac{2}{73}$ and $1\frac{1}{3}$ H.P.

FREE 39-page Handbook
Complete information on commutator maintenance.
Mail coupon.

IDEAL Products Are Sold through Leading Distributors

IDEAL INDUSTRIES, Inc.
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Send FREE Handbook and catalog sheets on:

☐ Resurfacers ☐ Flexible Abrasive
☐ Undercutters ☐ Cleaner-Blowers

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

EQUIPMENT

(Continued from page 86)

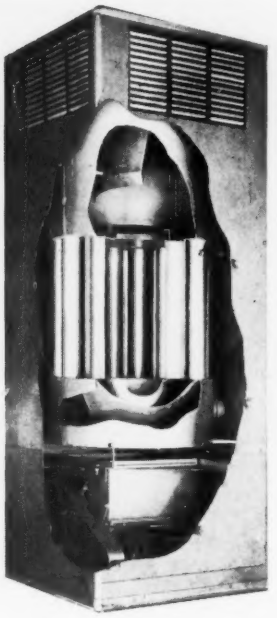
load in tons or the pressure per sq in. within the jack cylinder.

Illustrated is the model 25B22 with a rated capacity of 25 tons. Its closed height is 22 in., hydraulic lift is 16 in. Its base size is 10 in. by 12 in. and weight is 112 lb. Fluid capacity is approximately 3 pts. *Western Railroad Supply Company, Dept. RLC, 2428 South Ashland ave., Chicago 8.*

Speed Indicator

The model S speed indicator, was designed for locomotives, multiple unit, self-propelled and electric rail cars. Speeds are indicated directly to the operator in mph or kph, depending on the model installed. Model S-80 is calibrated 10 to 80 mph, while model S-120 is calibrated 10 to 120 mph. The model SK-120 is calibrated for speeds from 10 to 120 kph.

The device includes an axle drive unit, a flexible drive shaft and an indicator instrument. Its actuating mechanism consists of a ball governor mounted on a revolving shaft. The unit's 5-½ in. diameter dial is mounted in a chrome plated case, sealed for dust and waterproof protection for the ball bearing mounted mechanism. It is said to be ruggedly designed for severe service applications with only minimum lubrication maintenance required. *Barco Manufacturing Co., Dept. RLC, 500 North Hough st., Barrington, Ill.*

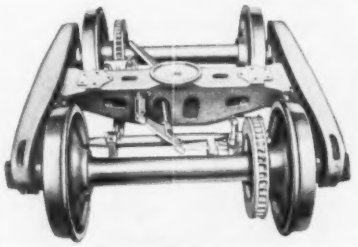


Space Heater

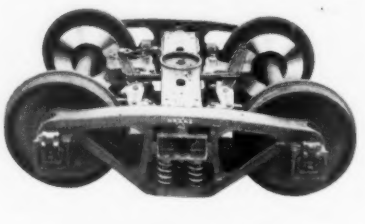
The Waikiki space heater is available in oil- and gas-fired models with an output of 200,000 and 500,000 Btu per hour. Compact and versatile, it can be installed vertically in an unused corner or hung horizontally from the ceiling. It can be

(Continued on page 90)

Off-Tread Freight Car Brakes Exhibited



American Steel Foundries off-the-wheel brake is designed for freight car trucks.



Buffalo Brake Beam's mechanical disc Brake-X has 15 months' freight service.

On express lines . . . and at whistle stops . . .

The performance and the brand are the same around the world

Other Outstanding Shell Industrial Lubricants

Shell Tellus Oil—for closed hydraulic systems

Shell Alvania Grease—multi-purpose industrial lubricant

Shell Turbo Oil—for utility, industrial & marine turbines

Shell Dromus Oils—cutting oils for high-production metalworking

Shell Rimula Oil—for heavy-duty diesel engines

SHELL TALONA R Oil 40 offers two outstanding reasons for its acceptance as a top-rated diesel-electric locomotive lubricant. It provides superior anti-wear protection and maintains engine performance.

Greatly reduced wear on pistons, rings and cylinder liners is assured because of the selected combination of additives used in Talona® R Oil 40. It has high oxidation stability, combined with resistance toward corrosion and sludge formation. It prevents ring fouling and provides excellent detergent-dispersant action.

Today—railroad operators abroad can enjoy the same Talona R Oil 40 the domestic carriers rely upon. For complete information, write to Shell Oil Company, 50 West 50th St., New York 20, N.Y., or 100 Bush Street, San Francisco 6, Calif.

SHELL TALONA R OIL 40

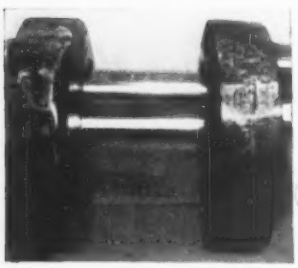
SHELL

THIS REBUILT CRANKSHAFT IS DYNAMICALLY BALANCED BY A NATIONAL FORGE SPECIALIST

The same close tolerances that we apply to new crankshafts govern your National Forge *reconditioned shafts.* They, too, are dynamically balanced to *original requirements* after they have been straightened, ground, chromium plated, and ground and polished.

Because National Forge is a specialist in both new and reconditioned crankshafts, we can guarantee your rebuilt shaft will meet the original shaft's specifications.

May we quote on your next job?



This is a finished, repaired crankshaft after processing by National Forge.

For more details on crankshaft repair, write for Bulletin RC-2.

NATIONAL FORGE
AND ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.

EQUIPMENT

(Continued from page 88)

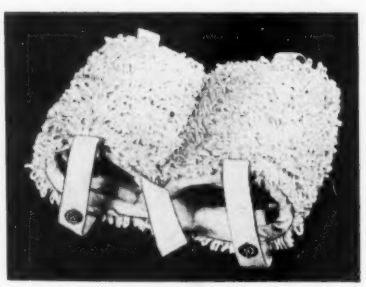
used with or without ducts. Heat can be directed where it is most needed or spread throughout an entire room. *Vapor Heating Corporation, Dept. RLC, 6420 West Howard st., Chicago 31.*

Draft Gear

This friction draft gear, the Mark 40, which fits standard 24⅝ in. pockets in freight cars and has over 40,000 ft lb of capacity, has been conditionally approved by the AAR. Its official capacity is rated at 42,420 ft lb.

The gear has a reaction force or sill pressure well under 500,000 lb, which is within coupler strength. It has 3¼ in. of travel and is used in combination with a special follower having a ½ in. offset which allows the standard coupler and yoke to be pulled forward ½ in., providing 3½ in. horn clearance. The gear is self-contained and pre-compressed for easy installation.

The new gear follows the proved principle of a coil spring actuated mechanism. Its unusually high capacity was accomplished through a new combination of sturdy heat-treated alloy steels, both in the friction elements and the housing, and the longer travel within the standard pocket. *Cardwell Westinghouse Company, Dept. RLC, 332 S. Michigan ave., Chicago 4.*

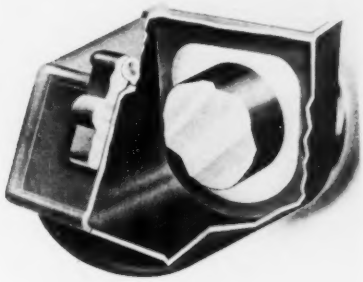


Journal Lubricator

This journal lubricator is approved by the AAR for limited application in interchange service. It has no specified top or bottom, or front or back. To position

it correctly within the journal housing, it is only necessary to place the lubricator so that the dividing line of the device is parallel with the axle. The product is made of 100 per cent cotton wicking backed by looped Neoprene bodies into which steel springs are molded.

Tests showed no displacement on impact, or freezedown. Its resiliency is said to provide constant journal contact with complete wetting and positive lubrication protection to the entire journal. The lubricator has high oil absorption capacity and is simple to remove, service and renovate. *Cardwell Westinghouse Company, Dept. RLC, 332 S. Michigan ave., Chicago 4.*



Dust Guard

The Turco dust guard is a one-piece chemical journal-box seal and plug. A resilient foam-type plastic material that absorbs and holds oil, the Turco dust guard protects the journal against entry of dust, water, brine, corrosive liquids, fumes and other contaminants. Because it extends up and out of the dust guard well, it acts as its own plug.

Being composed of an easily compressible material, it is actually forced into the well. The Turco dust guard is approximately double the thickness of the ¾ in. dust guard well. Its oil-retaining qualities reduce friction at the dust-guard seat. Movement of the axle within the box under load impact does not prevent effectiveness of the seal because the guard is distorted and moves readily and rapidly under such conditions. This dust guard is composed of an inert cellular plastic that is not reactive to oil, solvent, water or air. *Turco Products, Inc. Dept. RLC, Terminal Annex 2649, Los Angeles 54, Calif.*

Corrosion Inhibitor

This diesel cooling system corrosion inhibitor, Nalco 40, is claimed to be effective for corrosion prevention in diesel and other closed cooling systems as Nalco 39 inhibitor. The new material is a high-solubility, non-chromate pulverized material. It is available in liquid, pellet and pulverized forms. It protects

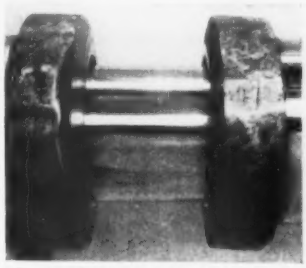
(*Continued on page 92*)

THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

We've specialized in rebuilding crankshafts, because since 1911 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

For more details on crankshaft repair write for Bulletin RC-1



This is a finished, repaired crankshaft, after processing by National Forge.

NATIONAL FORGE AND ORDNANCE COMPANY

Irvine (Warren County), Pa.

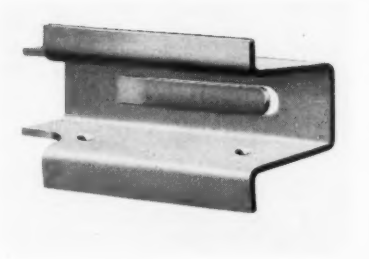
ferrous and non-ferrous metals, does not harm non-metallic materials used in cooling systems, contains no chromates, and is compatible with anti-freeze solutions. *National Aluminate Corporation, Dept. RLC, 6190 W. 66th Place, Chicago 38.*

Brake Beam Wear Plate

The Unit S-C wear plate, designed to control lateral movement of a hangerless brake beam under every operating and braking condition, utilizes a rugged spring extending into the wear plate, and in line with the vertical plane of the extended end of the brake beam

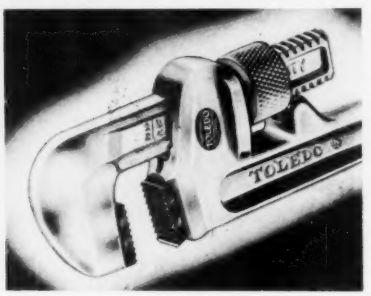
With the brake beam in normal released position in the side frame guides, these wear plate springs make no contact with the brake beam ends, so that the typical Unit operation is in no way affected.

When a brake application is made, however, the slightest lateral movement of the brake beam is immediately compensated by the corresponding spring in the direction of the movement, resulting in the brake beam being pushed back to its centered position. This prevents the brake shoe from climbing the wheel flange during braking, one of the major causes of excessive flange and brake shoe wear.



Because the spring and the wear plate itself are an integral fabrication, the S-C wear plate requires no service or adjustment, and the spring will maintain its specified deflection. The S-C wear plate is interchangeable with any Unit wear plates now in service. *Buffalo Brake Beam Company, Dept. RLC, 140 Cedar st., New York 6.*

(Products below are from companies not exhibiting at ARSA show.)



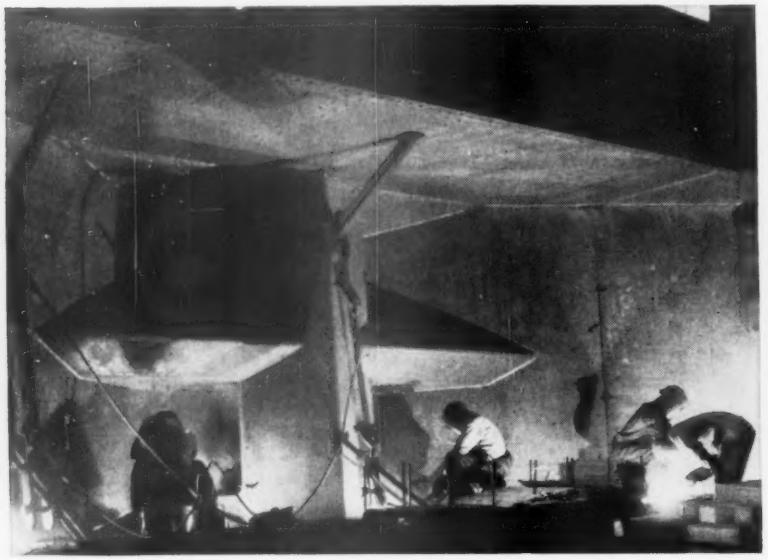
Aluminum Wrenches

These heavy-duty aluminum pipe wrenches, available in 10-, 14-, 18-, 24- and 36-in. sizes, are said to weigh less than half that of conventional and comparable malleable or steel wrenches. The wrenches feature an aluminum handle, housing and hook with replaceable forged steel insert jaws and a forged heavy-duty nut on the 10-, 14-, and 18-in. sizes, and a choice of forged aluminum housing and handle, forged aluminum hook with forged steel replaceable jaw inserts or forged steel hook on the 24- and 36-in. sizes. All models can be supplied with replaceable insert jaws of beryllium copper, non-sparking, for safety work. *Toledo Pipe Threading Machine Company, Dept. RLC, 1445 Summit st., Toledo 4, Ohio.*

Fiberglas Armature Banding Tape

Glass banding tape made with parallel glass fibers is now being used for replacing steel wire for banding armatures. They are made of Owens-Corning Fiberglas non-woven parallel glass yarns impregnated and bonded with General Electric Permafil polyester. They are

(*Continued on page 98*)



FOR DEPENDABLE WELDS

cover all your electrode needs with Lincoln

- *Fast, easy operation on AC or DC*
- *Good slag control— easy cleaning*
- *High deposition rate, more weld per rod*

E-6011 Fleetweld 35. For high speed, flat position or overhead butt and lap welds. Deep penetration, excellent arc stability. Good slag control and removal.

E-6012 Fleetweld 7. For all position welding of mild or low-alloy steel. High melt-off rate and low spatter. Ideal where fit-up is poor.

E-6014 Improved Fleetweld 47. Fast, easy operating, all-position iron powder electrode gives excellent bead appearance, extremely easy slag removal. 10% to 30% faster than conventional E-6013 electrodes. Up to 30% more weld per rod.

E-6024 Jetweld 1. Easy operating iron-powder electrode with high impact properties. For flat and near flat position work. Self-cleaning. Has smooth, stable arc action. Exceptionally high deposition rate.

Send for Weldirectory SB-1351. Write Lincoln Electric Railway Sales Company, 11 Public Square, Cleveland 13, Ohio. Railway representatives of

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Pioneering design keeps Fairbanks-Morse motive power first on the rails

F-M Diesel Engine Firsts

First with all-aluminum bearings

First with completely counterbalanced crankshaft

First with explosion-proof crankcase

First with an oil-tight engine

First to standardize on maintenance-free air filters

Each of these design advances was first available to the railroad industry in the Fairbanks-Morse Opposed-Piston Diesel.

Each is now standard in today's locomotive O-P engine.

This is the pattern at Fairbanks-Morse—Pioneer the Future . . . Improve the Present.

Through the F-M Unit Exchange Program these and many other design improvements in the O-P, and accessory groups, are available to you *now*.

In minimum time, at minimum cost, you can upgrade your F-M power with the only engine that is better than the O-P you now have—an Opposed-Piston Diesel made better *by Fairbanks-Morse*. Write: F-M Unit Exchange Program, Fairbanks, Morse & Co., Dept. RLC-9, 600 S. Michigan Ave., Chicago 5, Illinois, for details.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

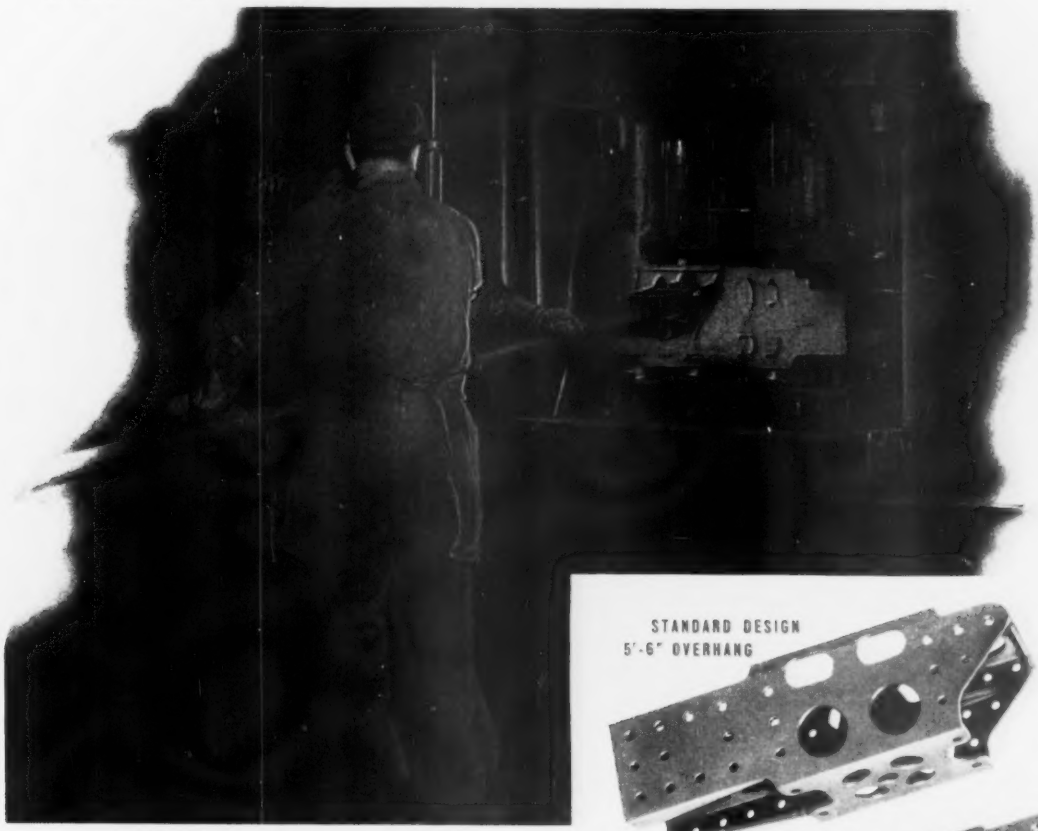
DIESEL LOCOMOTIVES AND ENGINES • MOTOR CARS AND RAILROAD EQUIPMENT • ELECTRIC MOTORS • GENERATORS • PUMPS
SCALES • WATER SERVICE EQUIPMENT • HAND LAMPS

BARBER STABILIZED TRUCKS

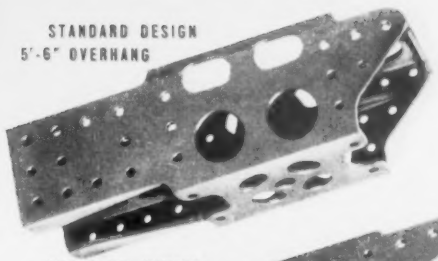
are easier to service

STANDARD CAR TRUCK COMPANY, 332 S. Michigan Ave., Chicago 4, Illinois.
In Canada: Consolidated Equipment Co., Ltd., Montreal 2.

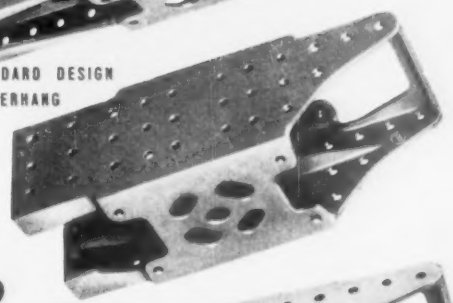
Check the **ECONOMICAL ADVANTAGES!**



STANDARD DESIGN
5'-6" OVERHANG



STANDARD DESIGN
5'-0" OVERHANG



INTEGRAL CAST BODY CENTER PLATE
(EITHER DESIGN)

Buckeye

HOT DIE PRESSED
BOLSTER CENTER FILLERS

One or Two Piece Design . . For Riveted or Slot Welded Application

- ✓ NO MACHINING REQUIRED
- ✓ CLOSE TOLERANCES
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- ✓ MAXIMUM STRENGTH
- ✓ ALL FIT SURFACES SQUARE
- ✓ ALL RIVET HOLES DRILLED

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ON STANDARD OR SPECIAL DESIGNS . . CALL or WRITE

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The Buckeye Steel Castings Co.

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★ COLUMBUS, O.
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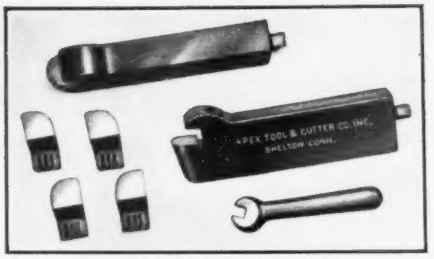
APEX INSERTED-BLADE METAL-CUTTING TOOLS

FOR ALL RAILROAD NEEDS

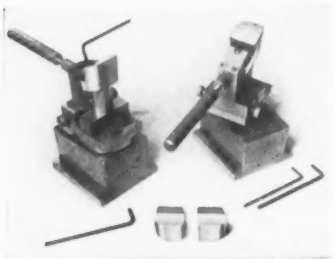
Metal cutting in railroad shops is constantly being speeded up, and at the same time materially reduced in cost, by the adoption of Apex Inserted-Blade Metal-Cutting Tools. Some of these tools are illustrated here; many others are shown in our railroad catalog, available on request.

Apex tool bits can be quickly changed because the holder does not have to be removed from the post. Finished tools of H. S. Steel, Supercobalt Steel, or with carbide tips, may be had in a great variety of types. Holders and tools for rails, or form tools for wheels, are all drop-forged of selected steels, and come finished ready for use.

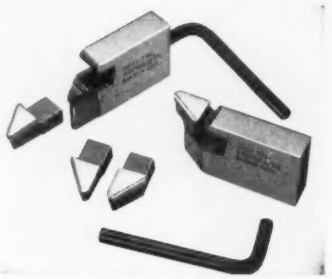
THE APEX TOOL & CUTTER CO., SHELTON 22, CONN.



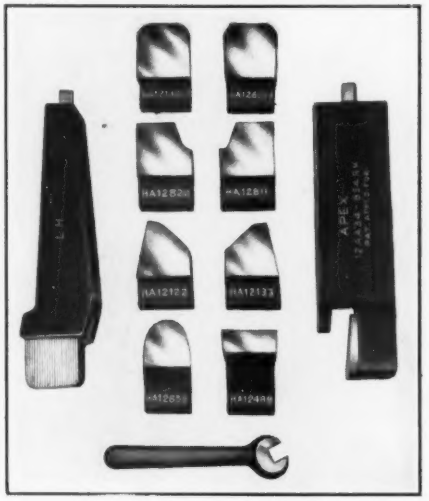
STANDARD AXLE TOOLS



AXLE TOOL RADIUS GRINDER



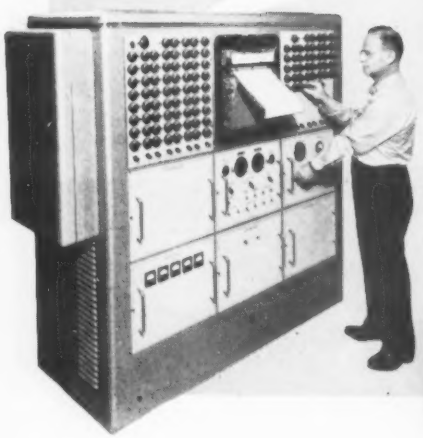
"SELLERS" AXLE TOOLS



RAIL AND FROG TOOLS

Lubricating Oil Analyses

BY AUTOMATION!



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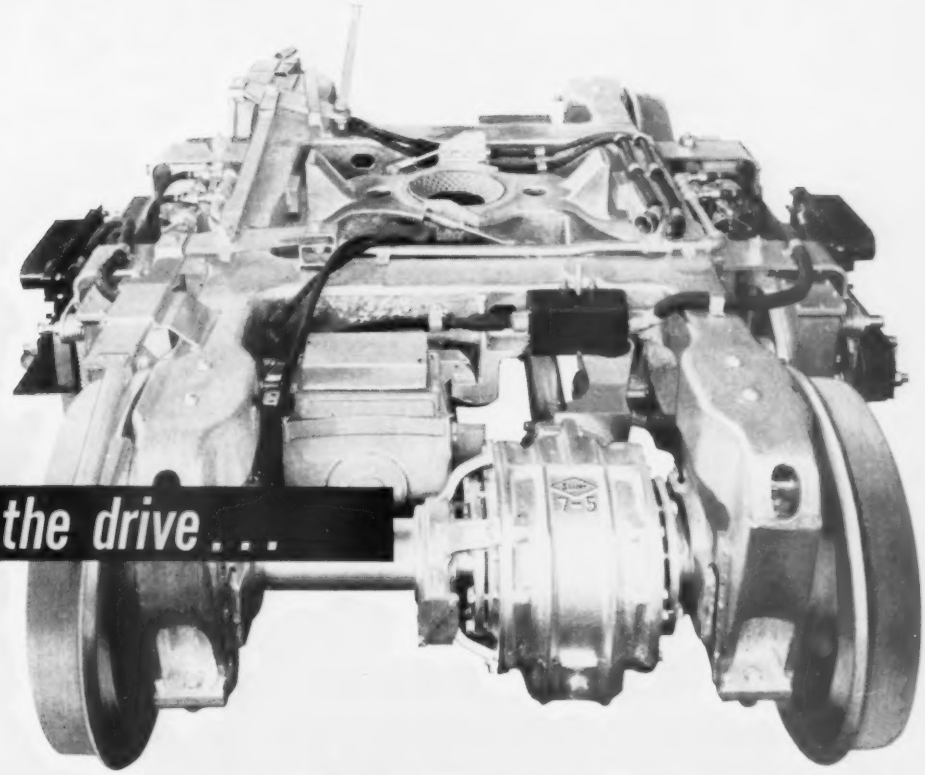
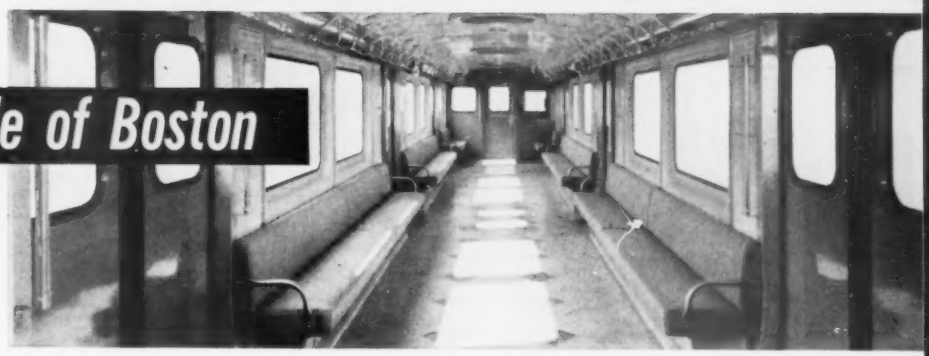
Teletype PG-544, Phone FRemont 1-2345 or write today for complete information

SPECTROCHEMICAL LABORATORIES, INC.
P. O. Box 8781, Pittsburgh 21, Pa.



This is the drive . . .

that speeds the cars . . .



that serve the people of Boston

The Spicer Model 7-5 Traction Motor Drive now is in use in 50 new Pullman-Standard traction cars serving the Metropolitan Transit Authority of Boston, Mass.

This is a new Spicer Drive, developed to take advantage of the weight savings that are being incorporated into Rapid Transit car design through the use of lighter weight, higher speed electric motors.

The drive can accommodate hypoid gearing in ratios from 5.67 to 1 up to 9 to 1. The unit is furnished completely assembled, requiring no field adjustment, bearing alignment, or gear setting when installed.

More than 13,000 Spicer Drives of several types are now in use throughout the world. Write for technical bulletins, stating your requirements.

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DANA PRODUCTS Serve Many Fields:

AUTOMOTIVE: Transmissions, Universal Joints, Propeller Shafts, Axles, Powr-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

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Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

DANA Spicer

NOW! We Can Service Your Traction Motor Field Coils

WITH EPOXI-MICA INSULATION

GIVING

1. HIGH DIELECTRIC STRENGTH.
2. HIGH THERMAL STABILITY.
3. EXCELLENT HEAT TRANSFER.
4. MOISTURE AND CHEMICAL RESISTANCE.
5. HIGH MECHANICAL STRENGTH.

New and rebuilt field coils can be supplied cast to pole pieces.

First to service the largest railroads with this EPOXY insulation.

MOTOR COILS MFG. CO.

401 Martindale St. Pittsburgh, Pa.

What's behind the trend to D.C. Hi-Potential Testing?

- Over 20 railroads are now using from one to six TAKK D.C. insulation test sets in daily operations.
- Canadian Pacific, Norfolk & Western, New York Central, Illinois Central, Canadian National, Santa Fe, Southern and Union Pacific are a few of the progressive roads now using these sets.

THREE BIG ADVANTAGES OF DC TESTING:

- Unlike AC, it shows relative condition of insulation and effectiveness of corrective measures.
- Unlike AC, it will not damage sound insulation.
- Like AC, it fully meets ICC requirements for annual over-voltage tests on all locomotive electrical equipment.

THE TAKK 5-KV SET (photo) performs standard resistance and over-potential tests on electrical systems of 5,000 volts and under. Its continuously variable voltage range and accurate and rugged micro-ammeter make it suitable for testing anything from the smallest test sample to the largest traction motor or diesel electric generator. It shows insulation leakage currents likely to be encountered in almost any test . . . from 0.01 micro-amperes to 1.0 milli-ampere.

SMALL, LIGHT AND RUGGED. The TAKK set combines complete portability (less than 1 foot cube, weighs less than 15 pounds) with accuracy, ruggedness, easy operation and moderate cost. Powered from a standard convenience outlet, it's completely safe for both operator and equipment. For heavy electrical equipment, higher voltage TAKK sets rated at 15, 30 and 45 KV are in widespread use.

FREE REPRINTS ON DC TESTING give an unbiased picture of advantages. Write today to: The Hewson Company, Inc., 433 Broad St., Newark 2, N. J. Or call HUmboldt 3-3000.

Prevent Electrical Equipment Insulation Failures with Proved Takk D.C. Test Sets

HEWSON

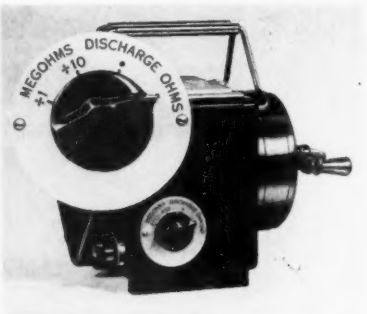
EQUIPMENT

(Continued from page 92)

intended for use as a high tensile, high modulus, low elongation, high impact strength, thermosetting tying and banding tape with excellent electrical properties.

The tape, known as Res-i-glas, is supplied in soft flat ribbon form. It is supplied semi-cured and requires no interleavers. The polyester reinforces the glass yarns, adding considerable tensile strength to the glass filaments in the cured stage.

In the cured stage, the tape is stiff and springy, and so hard it may be machined. To terminate the tape before cure, a hot soldering iron is used to fuse layer to layer. The tape bonds to itself after 20 minutes at 280 deg F. *Chicago Printed String Company, Dept. RLC, 2300 Logan Blvd., Chicago 47.*



Versatile Insulation Tester

A four-position switch has been introduced on the Meg-type of Megger insulation tester. The hand-operated generator models now provide facilities not formerly available in one instrument.

The A-R-K switch includes: A —megohms ÷ x 1 and ÷ x 10; R —ohm scale and K —capacitance discharge switch. In addition, there are earth, line and guard terminals so arranged as to require no change of connections when switching to the ohm scale.

The ratio or A switch divides by 10 the regular megohm scale. Thus an instrument having a normal range of 1 to 1,000 megohm scale. Thus an instrument having a normal range of 0 to 1,000 megohms also has, with the ratio switch, a range of 0 to 100 megohms, permitting insulation resistance measurements down as low as 10,000 ohms.

The discharge of K switch permits the discharge of capacitance in the apparatus under test. This charge is built up during the test because the test voltage is d-c.

The ohm or R scale has a range from 0 to 10,000 ohms. With it, tests can be made of conductor resistance without resorting to other test equipment, often an advantage when trouble shooting in

(Continued on page 100)

Have YOU tried the low toxicity-high flash CLEANER...?

F.O.-128

FINE ORGANICS 'SAFE-TEE' SOLVENTS

Ask your friends.
Undoubtedly many now use F. O. — 128!

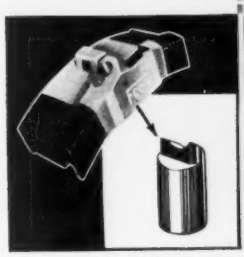
NO FIRE HAZARD!
35 RAILROADS USE!

- *Safe for personnel* — 20 times safer than carbon tetrachloride!
- *Effective*, speedy cleaner!
- *Non-corrosive*. No significant residue on drying!

See us at the Show—
Booth 342—or write Dept. R-9
FINE ORGANICS, Inc.
211 East 19th Street, New York 3, N. Y.

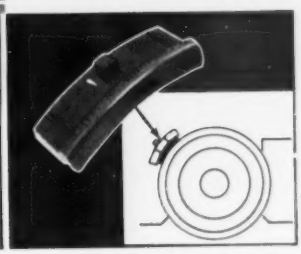
For Best Wheel Maintenance

FCC FLANGE CUTTERS



—cut flange down when needed, keeps wheel in perfect operating condition. Keeps engine rolling.

ABRASIVE BRAKE SHOES



—applied in place of regular brake shoe, grinds the wheel slowly, accurately, economically. Provides more efficient driving wheel contact.

For your best wheel maintenance, whether it is a flange cutter or a wheel abrasive shoe, be sure it is a "Wheel Truing Brake Shoe", designed especially to meet your needs. Write today for full information.

WHEEL TRUING BRAKE SHOE CO.

628 W. Baltimore Ave., Detroit 2, Michigan • "Abrasive Brake Shoes since 1898"

We're coming to Chicago

to present the NEW

Superflame CABOOSE HEATER

- **53,000 BTUs. Burns No. 1 or No. 2 fuel oil.**
- **Scientifically Louvered for maximum circulation.**
- **Cooking Surface for hot meals.**
- **Famous Superflame "Fuel-Saver" — saves 1/3 on fuel.**
- **Special Metering Valve for safe, controlled operation.**

Make a point to see the new Superflame Caboose Heater — a compact, ruggedly-built heater expressly made for the railroad. Complete with cooking surface for hot meals. Has famous Superflame burner and heat chamber. Heavy-duty 6" legs anchor the unit solidly. Built throughout to withstand vibration and shock.

We'll be in
Booth 100
Allied Railway Supply Exhibit

If you can't attend, send for more information.

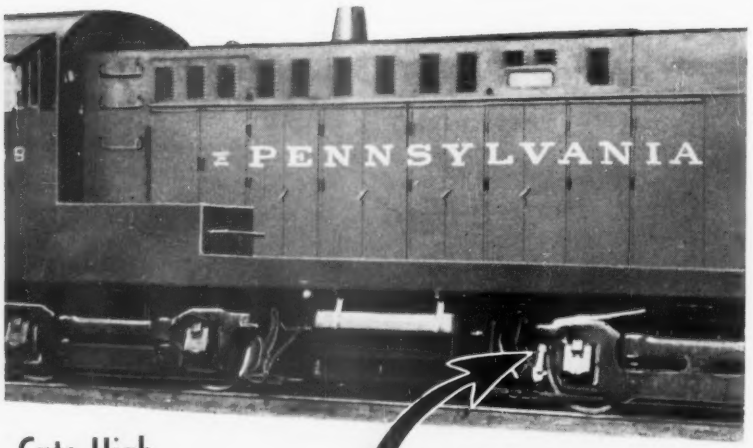
QUEEN STOVE WORKS, INC.
539 Front St., Albert Lea, Minnesota

Yes. We'd like to have more information about the new Superflame Caboose Heater.

Firm _____

Address _____

By _____



Cuts High Maintenance Costs

L & M WHEEL MACHINING APPARATUS

New and improved L & M Wheel Machining Apparatus reduces high flanges on locomotive wheels using the locomotive's own power. This new "Type SD-5" Cutting Head replaces the brake shoe. It is not necessary to take the locomotive to a Pit to change the Machining Apparatus from one pair of wheels to another.

Model SD-5 is readily installed on a pair of locomotive wheels in less than fifteen minutes! After cutting, brakes can be restored to operating condition in the same amount of time.

Diesel-electric locomotives can be converted quickly to furnish slow, even power for the cutting operation with a simple electrical adjustment. On one type Diesel-locomotive in general use this is achieved by simply blocking open the main generator field contactor. This will provide an even start, and at half throttle will give the desired 1 rpm for cutting. From 15 to 30 lbs. pressure in the brake system is sufficient.

Studies show that with 2 pairs of wheels fitted with L & M Cutting Heads the average locomotive "out of service" time was less than 1-2/3 hours per pair of wheels cut.

VISIT US at BOOTH 304

Allied Railway Supply Exhibit, Hotel Sherman, Chicago, Sept. 15-18

THE DURAMETALLIC CORPORATION

24 Commerce Street, Newark, N. J.

Mitchell 2-3444-5

EQUIPMENT

(*Continued from page 98*)

the field. The ohm scale is used in addition to and independently of the megohm scale.

This facility for discharging capacitance removes the hazard to persons and equipment that might come in contact with charged apparatus following the test.

The charge is dissipated in a manner that does no harm to the apparatus or the Megger instrument. The discharge switch opens the circuit between the measuring portion of the instrument and the testing terminals, and short-circuits the latter through a current-limiting resistor. *James G. Biddle Company, Dept. RLC, 1316 Arch st., Philadelphia 7, Pa.*

Brushes with Shock Absorbers

A hard rubber cap laminated to a protective Neoprene pad providing a double-duty shock absorber for motor and generator brushes has been announced. The hard cap receives the initial impact of shock and vibrations transmitted from machine to brush holder. This protects the softer pad from excessive wear and compression. The pad in turn protects the brush from short life, breakage and shunt fraying. The brushes are developed especially for railroad traction motors.

The resilient layer absorbs vibration from all causes, resulting in better contact between brush and commutator. The hard top layer resists wear or indention by the spring finger, permitting free movement of the brush throughout its life. The hard top layer distributes pressure over the entire area of the resilient layer, thereby increasing its life. *Speer Carbon Company, Dept. RLC, St. Marys, Pa.*

Have YOU tried the low toxicity-high flash CLEANER...?

F.O.-128

FINE ORGANICS 'SAFE-TEE' SOLVENTS

Ask your friends.
Undoubtedly many now use F. O. — 128!

MANY DEPARTMENTS SPECIFY 'Safe-tee' SOLVENTS

- Great for Diesel Electrical Equipment!
- Safe — contains no carbon tetrachloride or other cleaning health hazards!
- Will not cause dermatitis!

See us at the Show—
Booth 342—or write Dept. R-9
FINE ORGANICS, Inc.
211 East 19th Street, New York 3, N. Y.

Union Pacific Railroad Photo

Ex-Cell-O Pins and Bushings take high speed torture out of a million turns

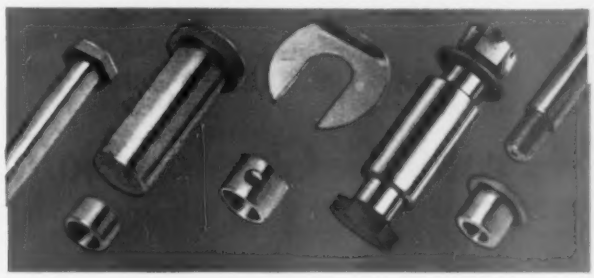
Imagine the stress and strain on the pins and bushings as these passenger cars roar around this curve in the Columbia River Gorge. Ex-Cell-O Pins and Bushings—performing for over 200 railroads—take this kind of treatment every day. Often are usable up to a million miles because of a super-fine finish and a specially heat-treated, diamond-hard steel case. Dust, strain, abrasion, weather, sudden jolts—Ex-Cell-O Pins and Bushings shrug them off over the miles.

Because of well-stocked warehouses, you get express-quick service. Railroad men like the exceptional service policy that backs up every Ex-Cell-O Pin and Bushing. Available as assemblies or separately.

Why not contact your Ex-Cell-O Representative or Ex-Cell-O, Detroit, soon?

EX-CELL-O CORPORATION — EX-CELL-O FOR PRECISION — XLO — 57-85

RAILROAD DIVISION, EX-CELL-O CORPORATION, DETROIT 32, MICHIGAN



America's foremost engineered lettering tools

designed to reduce your present costs **50 to 80%**

Used today by 1/3rd of the Nation's leading Railroads . .

DN

Spray it— **STENCILS**

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100
THE DEMP-NOCK COMPANY
DEMP NOCK
21433 MOUND ROAD • VAN DYKE, MICHIGAN • U.S.A.

At work on the B&O

No. 3—five electrode model, for high production positions—the real workhorse of the trade. Other models for heating two and three rivets at a time.

THE B&O USES CHESTON ELECTRIC RIVET HEATERS AT DU BOIS

In its busy shops at DuBois, the Baltimore and Ohio Railroad uses Cheston Electric Rivet Heaters because of the great economy and convenience built into our equipment . . . and because the cool, clean, quiet and entirely modern operation of the Cheston Heater is right for an up-to-date shop, and good for B&O employees.

The Cheston Rivet Heater is ready to go to work whenever . . . and wherever . . . the job is ready, and produces heated rivets within seconds of starting up. There is no waiting time loss while rivets come up to heat . . . no pre-heating expense before the shift begins . . . no fuel waste during idle periods. With a Cheston Rivet Heater there is no heat blast . . . blower roar . . . smoke . . . fumes . . . or grime. There is no fire hazard, as open hearths and fuel lines and stores are eliminated. No compressed air is required, so the air now lost to your blast type heaters is added to your tools for better quality work. Operating cost of a Cheston Rivet Heater averages out to about 15 cents per 100 lbs. of rivets heated. These features have made good sense to the B&O, and to scores of other railroads, large and small.

CHESTON ELECTRIC RIVET HEATERS
MAKE THE BEST SENSE FOR YOU, TOO.
WRITE FOR DETAILS TODAY.

Frank C. Cheston Company

60 Park Place — Newark 2, New Jersey

HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

SPECIAL TOOLS. Four-page Bulletin No. 70 illustrates advanced work-holding devices for use in metalworking industry. Featured are standard and special chuck jaws, expanding mandrels, gear hobbing arbors, special collets, milling machine adapters, cutoff blades and other unusually designed tools. (Write: *Sutton Tool Company*, Dept. RLC, Sturgis, Mich.)

ARMSTRONG TOOLS. 120-page general catalog includes 500 new types and sizes of wrenches, socket wrenches, drop forged clamps, tool holders, set-up and hold-down tools, cutting tools and pipe tools. (Write: *Armstrong Bros. Tool Company*, Dept. RLC, 5200 W. Armstrong ave., Chicago 30.)

END MILLS. 16-page catalog shows complete line, with prices and dimensions, of high-speed end mills. Contains also technical data section of Helpful End Mill Facts. (Write: *Chicago-Latrobe*, Dept. RLC, 411 West Ontario st., Chicago 10.)

JACKS. — 20-page catalog (1957-R) groups specifications for 145 models of Western (Buda) jacks for all trades, and briefly describes the special features of each group. (Write: *Western Railroad Supply Company*, Dept. RLC, 2428 South Ashland ave., Chicago 8.)

WELDING SUPPLIES. 8-page booklet (SB-1354) a "Weldirectory" of automatic electrodes and fluxes for submerged arc welding and hardsurfacing. Contains table showing combined properties of all weld metal deposits and a guide for flux selection by operating characteristics. (Write: *Lincoln Electric Company*, Dept. RLC, Cleveland.)

ELECTRIC PREHEATERS. 12-page pocket-size maintenance manual on Kim Hotstart electric preheaters deals with regular inspection and servicing of units and outlines a program of preventive maintenance. Contains models and sizes, parts list for standard and special units, drawings of various models, and information on replacement of elements. (Write: *Kim Hotstart Manufacturing Company*, Dept. RLC, West 917 Broadway, Spokane 1, Wash.)

SYNTHETIC LUBRICANTS. "Jet Age Lubricants," a 24-page manual, on the development, testing and application of engineered lubricants. Illustrates and

(*Continued on page 104*)

Have YOU tried the low toxicity-high flash CLEANER...?

F.O.-128

FINE ORGANICS 'SAFE-TEE' SOLVENTS

Ask your friends.
Undoubtedly many now use F. O.– 128!

35 ROADS USE FOR DIESEL ELECTRIC EQPT.

- *20 times safer than carbon tetrachloride!*
- *No significant residue on drying!*
- *Does not attack insulations!*
- *Non-corrosive. Safe! Effective!*

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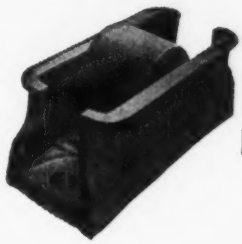
211 East 19th Street, New York 3. N. Y.



STUCKI

SIDE BEARINGS

FOR PROVEN DEPENDABILITY
LONG LIFE
HIGH CAPACITY
FREE SWIVELING TRUCKS

MATERIAL:
HIGH CARBON
ROLLED STEEL

A. STUCKI CO.
OLIVER BLDG.
PITTSBURGH, PA.

Take a tip from

UNION PACIFIC!

Prevent Sweat Damage to Lading with Frost's *Insulcote!*

One of the ways Union Pacific prevents damage to lading is with Frost's Insulcote . . . the modern undercoating for metal boxcar roofs.

Insulcote is an emulsion-type plastic coating that actually absorbs moisture, preventing condensation that can result in freight damage. Unlike asphaltic-type materials, Insulcote will not dissolve in mineral solvents and fumes. It adheres tenaciously to galvanized metal surfaces under any conditions.

Insulcote is safe, clean, non-inflammable. It is easy to apply with heavy-duty spray gun equipment and requires no preliminary acid treatment of the galvanized metal surface. The roof of a 40-foot boxcar can be undercoated with Insulcote in less than 15 minutes.

Frost's Insulcote is light tan in color to match car linings. It is available in 5-gal. steel pails and 55-gal. open-head steel drums.

***Other* FROST RAILWAY SPECIALTIES**

- **NO-RUST** Car Journal Compound
- **VERNIX** Floor Hardener
- **SURE-FOOT** Non-Slip Paint

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ALLIED EXHIBIT • HOTEL SHERMAN, CHICAGO
SEPTEMBER 16, 17, 18

Frost PAINT & OIL CORPORATION
1209 N.E. TYLER
MINNEAPOLIS 13, MINNESOTA

BUT HOW WILL THEY TREAT THE COM-MUTATOR?
HOW ABOUT THEIR MECHANICAL STRENGTH?
HOW OFTEN MUST THEY BE CHANGED?
HOW MANY MILES PER 1/8" WEAR?

the man on the left is R-I-G-H-T!

Any way you look at diesel-electric brushes this conclusion must invariably be reached . . .

The best, most economical grades for any given equipment are those that keep the commutators in the best condition under all operating conditions and over the longest mileage schedules.

Brush life is important, too . . . but, in the Stackpole "book", commutators and commutation come first . . . and for primary economic reasons.

Motor brushes, for instance, cost only about $12 a set.

Conservatively estimated, reconditioning a motor commutator costs around $400 . . . and perhaps more if it has been badly bar burned by brushes that had only long life to recommend them.

STACKPOLE

***Diesel Electric* BRUSHES**

STACKPOLE CARBON COMPANY, *ST. MARYS, PA.*

BRUSHES for all rotating electrical equipment • ELECTRICAL CONTACTS • CATHODIC PROTECTION ANODES • CHEMICAL ANODES • VOLTAGE REGULATOR DISCS • BEARINGS • WELDING CARBONS • MOLDS & DIES • SEAL RINGS • FRICTION SEGMENTS • ELECTRIC FURNACE HEATING ELEMENTS • CLUTCH RINGS • and other carbon, graphite, metal powder specialties.

HELPS FROM MANUFACTURERS

(*Continued from page 102*)

describes in detail testing operations conducted at Lehigh laboratory, with charts and graphs demonstrating physical properties of Anderol lubricants in comparison with petroleum lubricants—volatility, oxidation stability, evaporation, etc. (Write: *Industrial Service Department, Lehigh Chemical Company,* Dept. RLC, Chestertown, Md.)

DELIVERY SYSTEM FOR BULK GASES. 16-page pamphlet (Form ADC 663A) discusses bulk delivery method of handling industrial gases in large quantities. Illustrates types of delivery units and explains advantages of each. Shows plans for trailer unit parking and indicates yard space required. Contains also unit specifications and related information on control equipment, measurement of gas consumption, and distribution pipelines. (Write: *Air Reduction Sales Company, a Division of Air Reduction Company,* Dept. RLC, 150 East 42nd st., New York 17).

CORROSION CONTROL. 4-page folder on "Kel-F" dispersion coating system describes advantages of halofluorocarbon coatings for industrial corrosion control and contamination prevention. (Write: *Minnesota Mining & Manufacturing Co.,* Dept. RLC, 900 Bush st., St. Paul 6, Minn.)

SILICONE RUBBER. 6-page folder describes physical properties of Silastic silicone rubber for use wherever heat, cold, compression, oils, fuels, chemicals, moisture, etc., are a problem (Write: *Dow Corning Corporation,* Dept. RLC, Midland, Mich.)

JOURNAL STOPS. 20-page booklet, "Magnus R-S Journal Stops," contains design and performance data, drawings and statistics. Covers all installations on freight cars to May 15 of this year. (Write: *Magnus Metal Corporation,* Dept. RLC, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.)

RUST REMOVER. 4-page folder describes Turco alkaline rust, a chemical compound which is said to remove rust, paint and primer from metal surfaces in two simple steps without the use of acids. (Write: *Turco Products, Inc.,* Dept. RLC, 6135 South Central ave., Los Angeles 1, Calif.)

ELECTRICAL CONDUCTOR CODE NAMES.—38-in. by 29-in. wall chart, printed on washable, crack resistent plastic paper, lists past and present code names for aluminum electrical conductor. General section alphabetizes more than 600 code names and specifies type and size of products. Data on coverings, messengers, sizes and strandings tabulated. Both British and United States standard tables included. (Write: *Kaiser Aluminum & Chemical Sales, Inc.,* Dept. RLC, 919 North Michigan ave., Chicago 11.)

Have YOU tried the low toxicity-high flash CLEANER...?

F.O.-128

FINE ORGANICS 'SAFE-TEE' SOLVENTS

Ask your friends.
Undoubtedly many now use F. O. — 128!

PERFECT FOR FAST CLEANING OF RELAYS!

- *Minimum time* needed!
- 20 *times safer* than carbon tetrachloride!
- Requires *little supervision!*
- Low, *low cost!*

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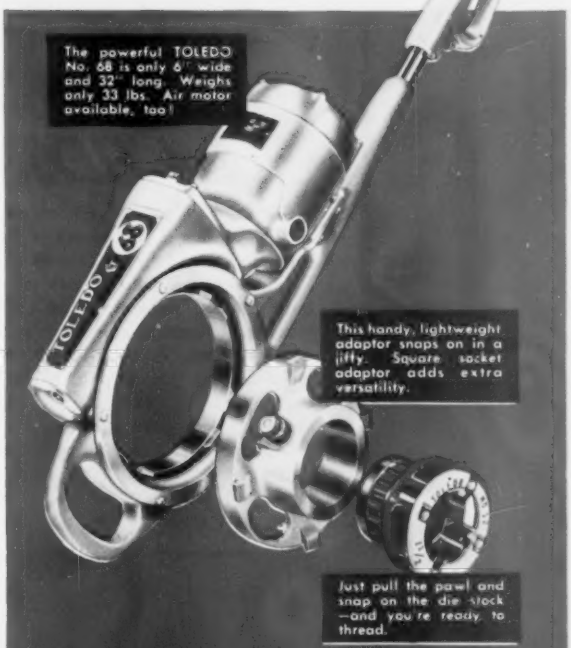
FINE ORGANICS, Inc.
211 East 19th Street, New York 3, N. Y.

TURNING POWER

For threading, cutting, hoisting, cranking, pulling, winching and dozens more!


The powerful TOLEDO No. 68 is only 6" wide and 32" long. Weighs only 33 lbs. Air motor available, too!
This handy, lightweight adaptor snaps on in a jiffy. Square socket adaptor adds extra versatility.
Just pull the pawl and snap on the die stock —and you're ready to thread.

TOLEDO No. 68 Power Drive will be the busiest—and the handiest—tool you ever owned. It's a rugged, lightweight workhorse, a husky worm and ring gear assembly powered by a ½ HP reversible motor, housed in a gleaming lightweight frame. With adaptors, the No. 68 makes a handy threader for pipe or conduit—handles die stocks up to 4". Die heads change in seconds. The No. 68 is only 6" wide—gets to work in cramped quarters. WHEREVER you need portable turning power the TOLEDO No. 68 is the answer.

This square socket adaptor puts real turning power on the spot . . . opening and closing valves . . . operating hoists and winches . . . operating tapping machines . . . turning earth augers . . . pulling wire through long conduits . . . bending pipe . . . and you'll find many, many more when you put a TOLEDO No. 68 to work for you! See your nearby TOLEDO distributor today!

Quality-Checked

BUILDERS OF THE WORLD'S FINEST PIPE TOOLS

TOLEDO®

PIPE THREADERS • PIPE WRENCHES • PIPE MACHINES

THE TOLEDO PIPE THREADING MACHINE CO., TOLEDO 4, OHIO

Brush up on your Spanish sales!

Read all about the big demand for U. S. rail supplies in Latin America? Then get acquainted with *Selecciones del Railway Age*—Spanish-talking sister publication of *RL&C* and *Railway Age*. With Latins buying U. S. equipment by the millions (67.5 millions last year) for a modern rail system—*Selecciones* is the newest and hottest place to lecture these senors on the best in locomotives and cars. In fact a well-spoken ad here is the only practical way to get the story of your product through the language barrier—over the border to a giant new railway world.

Don't depend on a Spanish-spouting salesman—he couldn't reach all the buying bases. Say it in *Selecciones*. It's the smart way to say sales in Latin America.

SELECCIONES
del Railway Age

30 Church St. **New York 7, N. Y.**

for long wearing fluid lines
STRATOFLEX
HOSE and FITTINGS
IGNORE VIBRATION
and FLEXING
For trouble-free fuel, air, oil and hydraulic systems, depend on Stratoflex flexible hose and reusable fittings. Stratoflex hose and fittings are designed for diesel, automotive and general industrial applications where vibration, flexing, corrosion and abrasion are problems. A wide range of sizes and types assures you of exactly the right hose and fittings for your specific requirements. Stratoflex leak-proof reusable fittings simplify maintenance by making possible quick, easy replacement or modification. You solve both design and maintenance problems when you specify Stratoflex.
TYPICAL ASSEMBLIES
SF 225 SINGLE WIRE BRAID HOSE with SF 323, 324 REUSABLE SWIVEL FITTING for fuel, air, oil, water, hydraulic, LP-Gas, anti-freeze and other fluid lines where superior resistance to abrasion and corrosion is required.
SF 205 STAINLESS STEEL WIRE BRAID HOSE with ALL BRASS SF 323 REUSABLE SWIVEL FITTING for medium pressure applications where extra resistance to corrosion is required. Especially suited for marine uses such as offshore drilling rigs.
SF 212 DOUBLE WIRE BRAID HOSE with SF 320 REUSABLE SWIVEL FITTING for high pressure applications. Working pressure range: 1,125 to 5,000 psi.
CALL YOUR INDUSTRIAL SUPPLY STORE OR WRITE FOR COMPLETE CATALOG.
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P.O. Box 10398 • Fort Worth, Texas
Branch Plants: Los Angeles, Fort Wayne, Toronto
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Atlanta
Chicago, Dayton
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Kansas City
Los Angeles
New York
San Francisco
Seattle, Toronto
Tulsa

PERSONAL MENTION

(*Continued from page 14*)

sion master mechanic at Winnipeg, appointed assistant engineer of motive power.

L. B. George

C. W. Parker

W. D. Dickie

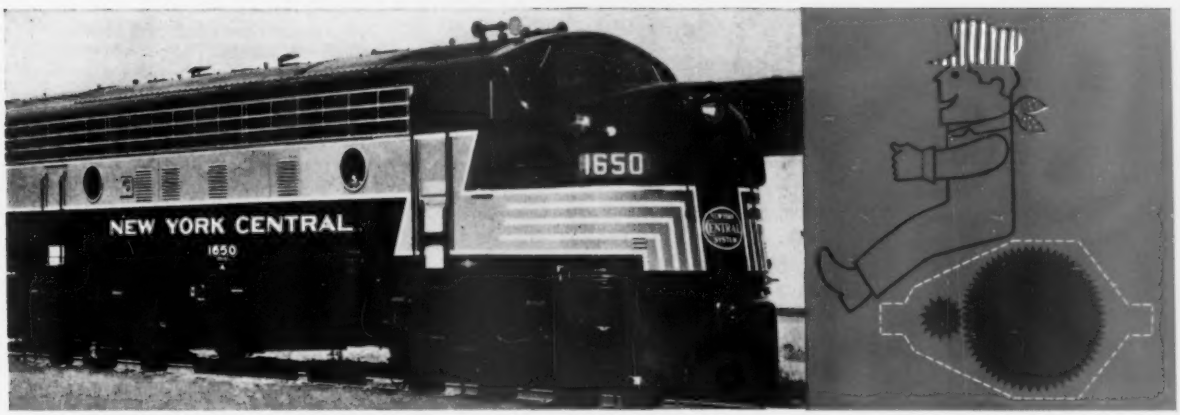
L. B. GEORGE appointed chief of motive power and rolling stock at Montreal as announced in the August issue. *Career*: Entered CPR service as a shop messenger at Vancouver in 1910. After World War I, in 1919, resumed training as a machinist apprentice at Vancouver. Subsequently locomotive foreman; shop foreman; assistant foreman, motive power, at Winnipeg; general locomotive foreman at Vancouver; and division master mechanic at Letbridge. During World War II engaged in special aircraft work. Became works manager of CPR at Weston shops, Winnipeg, in March 1942; assistant superintendent of motive power, western lines, in 1946, and assistant chief of motive power for the system on January 1, 1948.

W. D. DICKIE appointed assistant chief of motive power and rolling stock as announced in the August issue. *Career*: Apprentice at Glen Yard, Montreal; machinist apprentice at Winnipeg; chief draftsman; general locomotive foreman at Moose Jaw; division master mechanic at Calgary; supervisor of machinery; general supervisory of machinery, motive power department, at Montreal, and assistant works manager (locomotive) Angus shops.

C. W. PARKER appointed chief mechanical engineer as announced in August. *Career*: Worked as a machinist apprentice while attending University of British Columbia at Vancouver, from which he was a graduate in mechanical engineering in 1941. Later engaged on

(*Continued on page 108*)

PROVED!
DEPENDABLE TRACTION MOTOR GEAR LUBRICATION FOR OVER 6 MONTHS WITHOUT GREASE ADDITION!
NEW ESSO ARAPEN GEAR LUBRICANT



Extensive 18 month on-the-road tests by the New York Central Railroad have *proved* that Esso Standard's new Arapen Gear Lubricant gives completely dependable traction motor gear lubrication for well over six months. During the six-month periods *no* additional lubricant was required. Arapen outlasted the previously used lubricant by at least 6 to 1!

NEW YORK CENTRAL SYSTEM

New Esso Arapen Gear Lubricant is another exclusive development of Esso Research. For further information and technical assistance in the use of Arapen Gear Lubricant, call your local Esso office, or write: Esso Standard Oil Company, Railroad Sales Division, 15 W. 51st Street, New York 19, N. Y.

ARAPEN Reg. U. S. Pat. Off.

Performance advantages of **ARAPEN GEAR LUBRICANT:**

Reduced Leakage: maintains consistency through full range of operating temperatures, minimizing drippage on ties, pits and station platforms.

Improved Oxidation Stability: permits extended operation without hardening.

Excellent Structure Stability: reduces failures due to dry gears caused by excessive gear case leakage.

Better Anti-Wear Characteristics: high grease retention assures proper gear protection for prolonged time.

Esso

RAILROAD PRODUCTS

in steam and vapor
300 LIFTS per hour
for 12 years

overhead air hoists set new performance records

Since 1945 two Ingersoll-Rand Overhead Air Hoists have been continuously used by a firm in cleaning 55 gal. drums. These drums are slung beneath the hoists and lowered into a cleaning bath consisting of hot water and strong wetting and cleaning agents. As a result, clouds of steam and vapor practically obscure the hoists at all times. And except for minor repairs and standard maintenance, these hoists have never stopped.

Dependability and rugged construction are just two of the reasons why more and more plant men are specifying Ingersoll-Rand Air Hoists. These other important advantages contribute to long life and easier, safer operation:

Automatic Brake—holds the load automatically

Automatic Safety Up-Stop—shuts off air, stops motor before load reaches hoist

Graduated Reversing Valve—instant and complete control of hoisting action

Poppet Throttle Valve—prevents air leakage when hoist is idle

Pendent Throttle—The only complete line of air hoists with convenient "one hand" control.

Ingersoll-Rand Overhead Air Hoists are available in many types and sizes. Capacities range from 200 lbs. to 24,000 lbs. Your I-R AIRengineer can point out how these air hoists can give you new hoisting economy. Call him today, or write direct for catalog data.

8-530

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

PERSONAL MENTION

(*Continued from page 106*)

technical studies in research department, and in 1951 became special engineer, motive-power department.

Central of Georgia.—EUGENE T. HARRISON, JR., assistant diesel superintendent, Macon, Ga., appointed master mechanic, Columbus division. C. H. CARROLL, general diesel supervisor, appointed supervisor diesel locomotive maintenance, *Macon;* W. H. LEAVENGOOD, mechanical engineer, appointed assistant master mechanic — system, *Macon;* W. B. GRIMES, electrical engineer, appointed equipment engineer, *Savannah, Ga.*

Chicago & Northwestern.—JOHN CABLK appointed assistant diesel supervisor, *Chicago.*

Chicago, Burlington & Quincy.—*Chicago*: R. E. TAYLOR, mechanical engineer, appointed engineer equipment (design and maintenance). D. V. HON, superintendent car department, appointed assistant engineer equipment(design and maintenance). WILLIAM BAUER, general car inspector of lines east of Missouri river, appointed assistant engineer equipment (design and maintenance). J. J. MATHIEU, mechanical inspector, appointed general car inspector of lines east.

Denver & Rio Grande Western.—*Burnham shops, Denver, Colo.*: R. L. AGES appointed diesel instructor; D. W. MATSCHKE, machine and erecting shop foreman; R. A. McCURDY, diesel shop foreman; R. E. ELSTON, diesel maintenance supervisor and T. J. ORR, assistant electrical foreman.

Elgin, Joliet & Eastern.—HAROLD W. HARTSHORNE appointed assistant to the chief mechanical officer, *Joliet.* CHESTER LESNIEWSKI, car inspector, appointed car foreman, *South Chicago.*

Great Northern.—*St. Paul*: DONALD F. MARSTON appointed mechanical assistant. Formerly assistant master mechanic at Spokane, Wash. *Wenatchee, Wash.*: JOSEPH F. N. GAYNOR, superintendent of electrical operations, appointed assistant master mechanic.

Louisville & Nashville.—*Louisville, Ky.*: W. C. SEXTON appointed to newly created position of planning-production engineer. F. L. PEAK appointed engineer of planning.

New York Central.—*New York*: F. J. KUSSUTH appointed assistant general mechanical superintendent—car. A. F. HAGY succeeds Mr. Kossuth as supervisor car maintenance. V. F. KANIA succeeds Mr. Hagy as assistant supervisor car maintenance, and D. A. SWANSON succeeds Mr. Kania as general inspector. J. A. MACKINNON, JR., appointed assistant general inspector, and J. P. HAMM, assistant industrial engineer. *Harmon, N. Y.*: F. L. HOFFMAN, master mechanic, ap-

pointed general superintendent of diesel-electric shop.

Norfolk & Portsmouth Joint Car Inspector Association.—C. O. KEAGY, chief joint inspector, retired.

Southern.—*Spencer, N. C.*: CECIL D. SCHWINE, JR., appointed superintendent motive power. MANLEY H. HAMMETT, master mechanic, succeeds Mr. Schwine as manager, Spencer shop. PAUL T. HOSKINS, general foreman at Chattanooga, Tenn., succeeds Mr. Hammett. *Columbia, S. C.*: LAWRENCE S. PRESSON, JR., appointed master mechanic. Formerly general foreman car department-passenger, Hayne shop, Spartanburg, S. C.

Obituary

L. S. KURFESS, assistant superintendent car department, Erie, died July 30.

Supply Trade Notes

OLIN MATHIESON CHEMICAL CORPORATION.—*Sam Gurley, Jr.*, has been appointed vice-president of sales for Olin Aluminum.

■

DODGE MANUFACTURING CORPORATION.—*Paul Jordan*, plant engineer, has been appointed director of engineering.

■

DAYTON RUBBER COMPANY.—*George S. Smith* has been appointed sales engineer, Railway Division, covering the Minneapolis territory.

■

DOLPHIN PAINT & VARNISH CO.—*G. Gilbert Thorne* has been appointed sales manager at Toledo, Ohio, succeeding Marion Winkle who will continue with the company as a consultant and for special projects.

■

FARR COMPANY.—A two-story glass and red brick structure has been completed at El Segundo, Calif., at a cost of $250,000, adding 28,000 sq. ft for manufacturing and engineering facilities for Far-Air filters and other types of air filtration equipment.

■

DANA CORPORATION.—*Ray Reed*, assistant chief mechanical transmission engineer, has been appointed chief engineer of the railroad division.

■

THOR POWER TOOL COMPANY.—*William J. McGraw*, manager New York City branch office, has been appointed manager of the Thor electric tool sales division, with head-quarters in Chicago.

■

BRANDON EQUIPMENT COMPANY, INC. Brandon Equipment will take over sale of equipment developed by R. E. Russell & Co. of Hughesville, Pa., for railroad flat cars used in piggyback service. *Col. R. E. Russell*, who has

FR TORSION BAR TORQUE CONTROL

TORQUE CONTROL IMPACTOOLS meet torque specifications 100%

Quality Control Improved on 12 Jobs in 3 Departments

1. **Cable control assemblies:** 5 operations involving torques from 14 to 75 ft. lbs.
2. **Scraper Assembly:** 6 line jobs using Impactools set for 40, 60, 75 and 80 ft. lbs. torques.
3. **Hydraulic control assembly:** 1 job running ½" cap screws to 65 ft. lbs. torque.

Production checks made by this manufacturer of road building equipment show that new Ingersoll-Rand Torsion-Bar Torque Control Impactools run every nut and cap screw within torque specifications.

With the standard impact wrenches previously used, the operators attempted to control torque by length of time the tool impacted. The new Torque Control Impactools shut off instantly and automatically when the pre-set torque is reached. This simplifies operator training and improves worker morale.

The end result is dependable product performance in the field. This same kind of cost-saving performance can be put to work for your company now. Write for Bulletin 5170.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

headed the Russell company, will have charge of Brandon sales in the eastern region for the combined line of products.

■

CANADIAN CAR COMPANY, LTD.—Can-Car has acquired all the railway equipment business formerly carried on by the Standard Railway Equipment Manufacturing Company at Lachine, Que. Manufacture of railway equipment will continue at Lachine until Can-Car facilities are completed at its Dominion plant in about a year.

■

SIMMONS-BOARDMAN PUBLISHING CORPORATION.—*William E. Glasby* has joined Simmons-Boardman as district manager at Philadelphia. Mr. Glasby attended Lehigh University and Franklin & Marshall College, graduating from the latter with a B.S. in economics. Following 15 years in engineering and sales with American Lava Corporation, a subsidiary of Minnesota Minning & Manufacturing, he was associated with the Western Railroad Supply Company, Chicago, as advertising manager. Mr. Glasby is a native of New Jersey. *Harry M. Blunt* has joined Simmons-Boardman as district representative at Cleveland, Ohio. Mr. Blunt, a native of Ohio, entered railroad service with the Erie in the superintendent's office at Youngstown in 1923, joined the Pennsylvania in 1926, and served in the freight traffic department of that road until his recent appointment with Railway Locomotives and Cars and its allied railway publications.

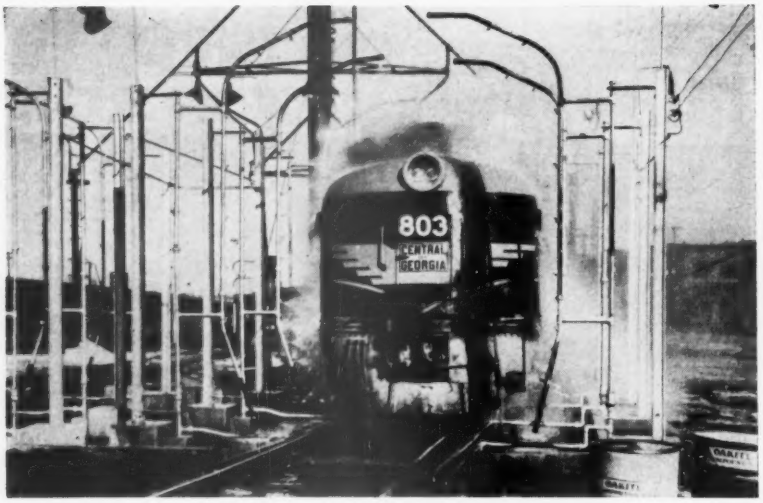
■

AMERICAN BRAKE SHOE COMPANY, NATIONAL BEARING DIVISION.—*Albert L. Hunt*, general manager at St. Louis, has been appointed a vice-president in charge of manufacturing operations for plants in St. Louis, Meadville, Pa., and Clearing, Chicago. *Paul J. Bauman*, general manager in Meadville, Pa., has been appointed a vice-president in charge of industrial sales. Mr. Bauman is located in Pittsburgh.

■

BLACK & DECKER MANUFACTURING CO.—A factory service and sales branch has been opened at 33 Webster Street, Hartford, Conn., in charge of John T. Tierney, branch service manager.

(*Turn to page 112*)



Spray washing originated by Oakite contributes to low-cost end results

Cleaning by the best methods and with quality materials costs less in the end every time.

In washing diesel units and passenger car surfaces and running gear, that means a material such as Oakite Compound No. 88 and pressure-spray cleaning and rinsing—the basic system which *Oakite pioneered over 10 years ago* and which has since become standard practice.

While a variety of these systems is now available, Oakite supplies blueprints and specifications to permit "custom" fabrication of spray equipment in railroads' own shops.

To make sure *your* pressure washing of equipment ends up at lowest possible cost, take advantage of the safety, efficiency, and streak-free results provided by Oakite cleaning compounds. So many leading roads already are. For more information, drawings or data write OAKITE PRODUCTS, INC., 46 Rector Street, N. Y. 6, N. Y.

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MATERIALS · METHODS · SERVICE
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FOR SALE

New General Electric Traction Generators

Manufactured 1955 and 1956—
Never installed—With Exciters

7 Model GT-591-A 1200 HP
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— wire or phone collect —

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WESTERN

LOCOMOTIVE AND CAR JACK

Lifts Capacity Loads Easier

25-35 and 50 Ton Models

Looks funny, doesn't it? A woman's hand on a big, rugged jack . . . but this is one way of dramatizing how much easier it is to lift capacity loads with WESTERN LOCOMOTIVE AND CAR JACKS, *the first to be equipped* with Timken roller thrust bearings. All the old, reliable standby features that have made WESTERN jacks a top favorite are still there: the "Postop" that prevents ram from being raised beyond the safe limit; free acting screw movement and the "just right" pitch of the threads for maximum lift and smooth action.

Easier lifting of capacity loads is an extra bonus *only* WESTERN can offer because *only* WESTERN equips these jacks with Timken roller thrust bearings.

Tapered Roller TIMKEN BEARING EQUIPPED

Write for Bulletin No. 1957

WRRS

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Division of Western Industries, Inc.

2400-2434 S. Ashland Avenue • Chicago 8, Illinois

CANADA: Melville Machinery Co., Ltd., 515 Bisson St., Montreal 3, Quebec

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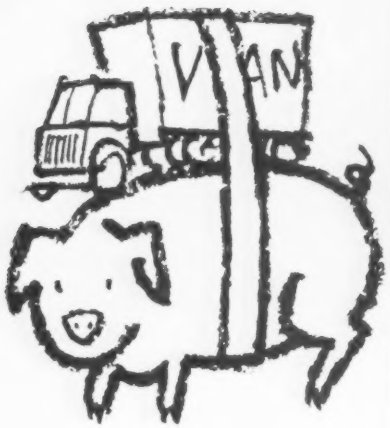
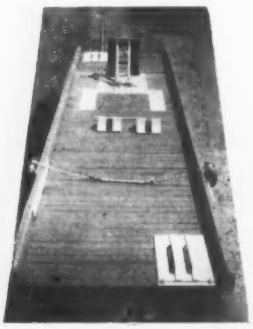


This Truck goes to Market

PIGGY BACK

Now Paxton-Mitchell's Piggy Back Pac holds down all makes of trailers without special attachments. Universal hitch, built-in shock absorber, adjustable chain fastenings makes this the easiest, fastest operating unit available. Folds flush when knocked down.



PIGGY-BACK PAC

on display at Boths 49-52 at the Chicago Convention

Another important product • for the railroad industry from

PAXTON-MITCHELL Company

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27th & Martha Sts. • Omaha, Nebraska

J. P. Kelly

N. Fesmire

H. R. Rowland

W. M. Schleicher

SUPPLY TRADE NOTES

(*Continued from page 110*)

GOULD - NATIONAL BATTERIES, INC.—*John P. Kelly*, Detroit regional manager, has been appointed general sales manager of the Industrial Division, with headquarters in Trenton, N.J.

■

JAMES G. BIDDLE COMPANY.—*Philip E. Sellers* has been appointed sales manager at Philadelphia.

■

ALCO PRODUCTS, INC.—Extensive modernization and rearrangement under way at the Schenectady, N. Y., locomotive plant is scheduled for completion in December at a cost exceeding $1,000,000. The program calls for the modernization of the present general welding shop, sub-assembly and truck shop, and miscellaneous machine shop. Subsequent rearrangement work, to complete the integration of locomotive production into the "west side" plant area, will be accomplished in the future. The facilities will replace the present locomotive erection shop on the east side of the plant.

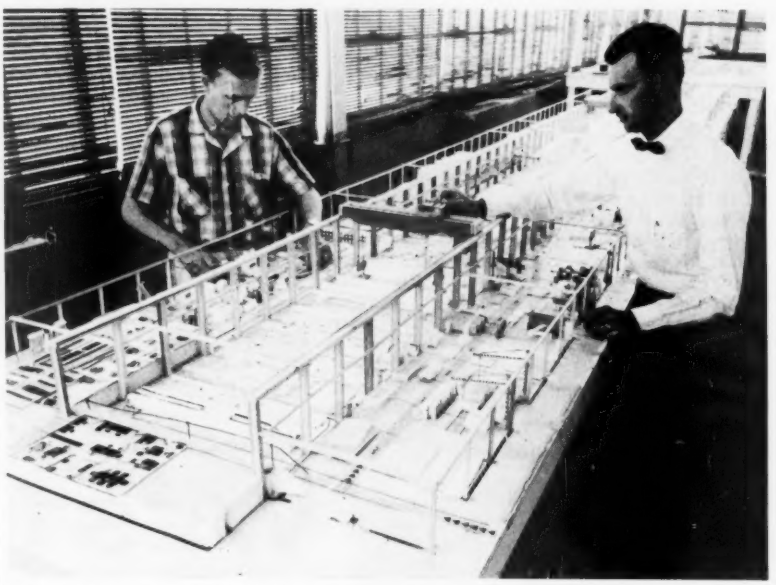
C & D BATTERIES, INC.—*Wallace M. Schleicher*, formerly general sales manager for Edison Storage Battery Division of Thomas A. Edison Industries, has been named manager, motive power and railroad sales, for C & D Batteries, Inc. *Harrison Taylor* has joined the headquarters service division, engineering department, of C & D, having formerly been with the Electric Storage Battery Company as staff engineer. *Lu Ray Staff* has joined the Buffalo, N.Y., office.

■

A. M. BYERS COMPANY.—*Harry R. Rowland*, general manager of sales has been elected vice-president of wrought-iron sales. *Richard I. Enzian*, manager of the Washington, D. C., division, has been appointed manager of wrought iron sales, at Pittsburgh. *Chester W. Leschenko* has been assigned as a field service engineer to the Pacific coast division.

■

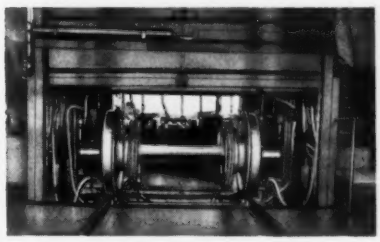
BUDD COMPANY.—*Norman Fesmire*, who has held various engineering posts with Budd since 1942, has been appointed executive engineer of the Railway division.



Scale model of Alco's projected new progressive-station locomotive assembly building at Schenectady, N.Y. In the foreground is the area where underframes and side trusses will be fabricated before moving to the assembly area in the opposite half of the building.

THOROUGH but Gentle

Pressurized chemical cleaners and live steam whisk away dirt and grime in the Paxton-Mitchell Wheel and Bearing Washer. Yet there's no need to mask machine parts with this gentle, thorough cleaning. Journal boxes and bearings cleaned in this same unit.



Wheel and Bearing WASHER

Tours arranged at Booths 49-52

Another important product for the railroad industry from

PAXTON-MITCHELL Company

Dept. RL

27th & Martha Sts. • Omaha, Nebraska

R. H. Waite

H. H. Rogge

ACF INDUSTRIES, AMERICAN CAR & FOUNDRY DIVISION.—*Herbert H. Rogge*, executive vice-president, has succeeded *Samuel M. Felton* as president. Mr. Felton will continue with the company as an advisor.

■

A. M. BYERS COMPANY—NATIONAL ELECTRIC PRODUCTS CORPORATION.—National Electric has been given exclusive finishing and marketing rights to the A. M. Byers Company's Underwriters' Laboratories approved wrought-iron electrical conduit.

■

MACLEAN FOGG LOCK NUT COMPANY.—*Robert H. Waite*, who has been in railroad sales for MacLean Fogg Lock Nut since 1951, has been appointed railroad sales manager.

■

BUCKEYE STEEL CASTINGS COMPANY.—*John R. Codner* has been appointed sales representative in the eastern district, New York.

■

FAIRBANKS, MORSE & CO.—the following have been reassigned: *Robert H. Morse, III*, from vice-president, sales, to vice-president, budgets and planning; *V. H. Peterson*, from vice-president, engineering, to vice-president, sales; *John A. Cuneo*, from vice-president and assistant to president to vice-president, foreign operations. *John C. Elmburg*, assistant general sales manager, promoted to general sales manager, and *G. R. Anderson, Sr.*, manager of the Kansas City, Kan., works, appointed chief engineer. *C. E. Clausen*, manager of the St. Johnsbury, Vt., works, named to succeed Mr. Anderson. Mr. Clausen's successor is *H. M. Goodchild*, chief engineer at St. Johnsbury, who in turn is replaced by *G. R. Anderson, Jr.*

■

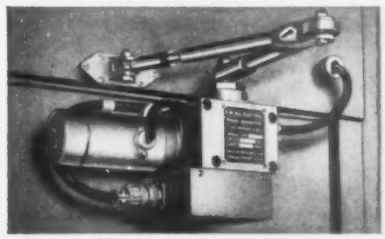
GRIFFIN WHEEL COMPANY — Griffin will build a plant for the manufacture of cast steel railroad wheels at Muncie, Kan. The new operation, scheduled for completion in the fall of 1958, will have a capacity of 120,000 wheels a year.

OBITUARY

EDWARD H. WANNEMACHER, who recently retired as vice-president in charge of sales of the James G. Biddle Company, died on July 3.

FEATHER TOUCH

At the slightest touch the Paxton-Mitchell Door Operator opens doors and automatically closes them again. This all-electric operator, available for all types of vestibule doors gives passengers and personnel the convenience of "touch and go" operation.



ALL-ELECTRIC Door Operator

on display at Boths 49-52 at the Chicago Convention

Another important product for the railroad industry from

PAXTON-MITCHELL Company

Dept. RL

27th & Martha Sts. • Omaha, Nebraska

FLUSH FIT MOISTURE TIGHT..

...WITHOUT COUNTERSINKING

Lewis sealtite car bolts

Each Lewis Sealtite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

All products manufactured in the U.S.A. to A.S.T.M. specification.

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MINNEAPOLIS 14, MINNESOTA

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LOCOMOTIVE WHEEL LIFE

30% TO 300%!

WITH *Nalco* TYPE TA **FLANGE LUBRICATOR**

USING *Nalco* **"MOLY"** STICKS

Nalco "Moly" Stick is a highly-efficient *dry* lubricant that maintains a lubricating surface between locomotive wheel flanges and track under extremes of pressure and temperature . . . without *picking up dirt and sand to form a grinding compound.* In new Nalco Type TA Lubricators, "Moly" Sticks provide automatic flange lubrication that has extended wheel life from a substantial 30% to as much—particularly on yard locomotives—as a whopping 300%!

Cost of Nalco Type TA Lubricators and "Moly" Sticks is small. Maintenance is limited to occasional stick replacements. Complete installation of lubricators on a diesel unit can be done by your shop personnel in four hours or less.

Call or write for details on the simplicity and continuing economy of Nalco Flange Lubrication for your locomotives.

NATIONAL ALUMINATE CORPORATION

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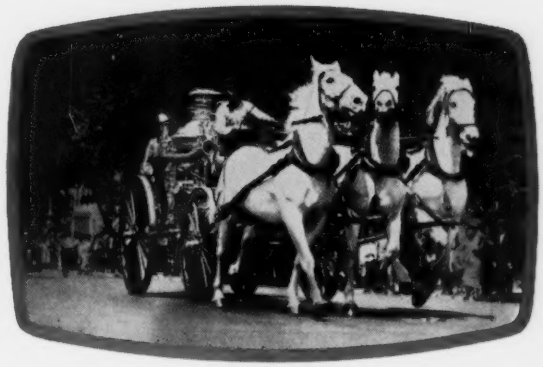
SEE TIMKEN TELEVENTS ON NETWORK TV

Two big hour-long spectaculars this fall

Over 126 NBC STATIONS, SEPTEMBER 23rd

"Eleven Against the Ice", the story of the Antarctica Turnpike. See men and machines build a trail across Antarctica's frozen wastes—in spite of 200 mph winds, temperatures of 120 degrees below zero and crevasses big enough to swallow a 20-story building. It's a triumph of engineering and human courage, a whale of a television show.

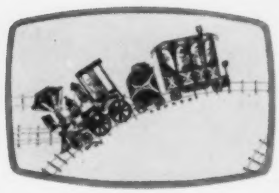


Over 142 NBC STATIONS, NOVEMBER 21st

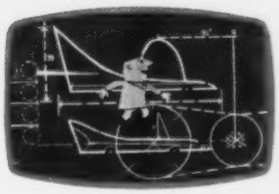
"The Innocent Years". Recaptured from exciting old films and newsreels, you'll see happy days relived. Experience the excitement of "Teddy" Roosevelt, Thomas Edison and Mark Twain in action. Hear songs like: "In the Good Old Summertime", "He'd Have to Get Out and Get Under". Enjoy the fun of family picnics, the joys of people in the last untroubled time in our history.

And commercials that help you sell . . .

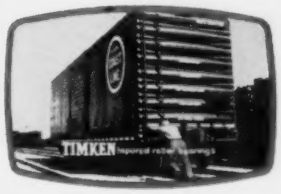
See How man stumbled on the concept of the wheel.



See Why America's railroads have always led the world.



See Why Americans jump for the latest thing in cars.



See One man push a freight car all by himself.

Years of national and trade advertising have made the name "Timken" the best-known name in bearings. People have learned to look for Timken bearings wherever wheels and shafts turn. Shippers have learned that the railroads are switching to "Roller Freight"—using Timken bearings on freight cars. And they know that "Roller Freight" makes their shipping even more reliable—making Timken bearings a big plus in railroad freight sales. Now network television will build an even greater awareness of Timken bearings—make them a bigger plus in gaining business for the railroads. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN TAPERED ROLLER BEARINGS

TRADE MARK REG. U.S. PAT. OFF.